Valley
Solid Waste Commission

PHASE 1

A WASTE AUDIT of THE CARLETON-VICTORIA SOLID WASTE MANAGEMENT REGION

Prepared by :

Washburn & Gillis Associates Ltd.

Owen Washburn Associates Ltd.

In association with :

Fiander - Good Associates Ltd.

1992 07 28

Recycled Paper

LEGISLATIVE LIBRARY
BIBLIOTHÈQUE DE L'ASSEMBLÉE
LEGISLATIVE
OCT 13 1992
FREDERICTON, N.B.

PHASE I: A WASTE AUDIT OF THE CARLETON-VICTORIA SOLID WASTE MANAGEMENT REGION

SUBMITTED TO:

VALLEY SOLID WASTE COMMISSION
SOMERPLACE MALL
P.O. BOX 480
HARTLAND, NB
E0J 1N0

SUBMITTED BY:

WASHBURN & GILLIS ASSOCIATES LTD.
123 YORK STREET
FREDERICTON, NB
E3B 3N6

AND

OWEN WASHBURN ASSOCIATES LTD.
P.O. BOX 488, STATION A
FREDERICTON, NB
E3B 4Z9

IN ASSOCIATION WITH:

FIANDER-GOOD ASSOCIATES LTD.
P.O. BOX 207, 335 QUEEN STREET
FREDERICTON, NB
E3B 1B1

DATE:

1992 07 28

TABLE OF CONTENTS

Chapter Number	Title	Page Number
	EXECUTIVE SUMMARY	
1.0	INTRODUCTION	1.1
	1.1 Approach	1.2
	1.2 Study Area and Waste Generation Zones	1.3
2.0	STUDY APPROACH OVERVIEW	2.1
	2.1 Background	2.1
	2.2 Secondary Resources Survey	2.3
	2.3 Operational Surveys Component	2.3
	2.4 Dump Site Field Surveys	2.5
	2.5 Residential Waste Audit Survey Component	2.5
	2.6 ICI Waste Audit Component	2.7
3.0	PROFILE OF EXISTING WASTE HANDLING PRACTICES	3.1
	3.1 Existing Dump Site Locations	3.1
	3.2 Waste Practices by Municipalities and LSD's	3.2
	3.2.1 Waste Disposal	3.2
	3.2.2 Waste Collection	3.2
	3.2.3 Waste Recycling	3.3
	3.2.4 Waste Generation	3.3
	3.3 Waste Collection Practices	3.5
	3.4 Local Dump Site Operations	3.8
	3.5 Recycling Operations	3.16
	3.6 Other Recycling and Waste Diversion Activities	3.20
4.0	WASTE GENERATION AND COMPOSITION	4.1
	4.1 Residential Waste Generation	4.1
	4.2 ICI Waste Generation	4.5
	4.2.1 Industrial Waste	4.5
	4.2.2 Commercial Waste	4.13
	4.2.3 Institutional Wastes	4.16
	4.2.4 ICI Waste Volumes	4.18
	4.3 Waste Composition	4.18

TABLE OF CONTENTS
CONT'D

Chapter Number	Title	Page Number
5.0	WASTE COLLECTION AND DISPOSAL COSTS	5.1
5.1	Residential Waste Collection Costs	5.1
5.2	ICI Waste Collection	5.2
5.3	Dump Site Costs	5.4
5.4	Residential Waste Collection and Disposal Costs	5.5
6.0	FUTURE WASTE GENERATION	6.1
6.1	Population Projections	6.1
6.2	Industrial and Other Economic Growth	6.3
6.3	Future Solid Waste Quantities	6.4

APPENDIX A - LIST OF SOURCE MATERIAL

APPENDIX B - SURVEY QUESTIONNAIRES

APPENDIX C - CARLETON - VICTORIA REGION DUMP SITES

APPENDIX D - RECYCLING FACILITIES AT WOODSTOCK

LIST OF TABLES

Table Number	Title	Page Number
1.1	Study Area Waste Generation Zones - Population and Households	1.5
2.1	Carleton-Victoria Region - List of Contacts	2.4
2.2	Carleton-Victoria Region Waste Haulers and Recyclers Sample - List of Contacts	2.6
2.3	Carleton-Victoria Region ICI Survey Sample - List of Contacts	2.9
3.1	Waste Tonnages as Generated by Municipal Services	3.5
3.2	Waste Hauler Interviews - Summary of Responses	3.6
3.3	Carleton-Victoria Region Disposal Sites - Summary Table	3.10
3.4	Estimated Recycled Waste Volumes (Tonnes)	3.19
4.1	Residential Waste Generation Rates at Fredericton and Nepisiguit-Chaleur Regional Landfill Sites - 1991	4.3
4.2	Annual Residential Waste Volumes for the Chaleur-Victoria Region	4.4
4.3	Carleton-Victoria Solid Waste Audit Summary of Non-Residential Uses By Zone	4.6
4.4	List of Firm Categories by Sector	4.7
4.5	Carleton-Victoria Region Estimate of Potato Waste Generation	4.11
4.6	ICI Wastes Generated - Disposed Volumes	4.19
4.7	Other ICI Wastes - Volumes Not Disposed	4.20
4.8	Carleton-Victoria Region Residential and ICI Waste Stream Composition	4.21
5.1	Carleton-Victoria Region Residential Waste Collection Costs (1992)	5.2
5.2	Carleton-Victoria Region Public Dump Site Costs	5.6
5.3	Summary of Residential Collection and Disposal Costs	5.7
6.1	Carleton-Victoria Region Zone Population Projections	6.2
6.2	Carleton-Victoria Region Projected Residential and ICI Solid Waste Volumes	6.5

LIST OF FIGURES

Figure Number	Title	Follows Page Number
1.1	Approach to Development of a Comprehensive Waste Management Strategy	1.1
1.2	Study Area	1.3
3.1	Disposal Site Locations	3.1
4.1	Estimated Composition of Carleton-Victoria Region Solid Waste Stream	4.22

EXECUTIVE SUMMARY

The following points highlight the findings of the solid waste audit of the Carleton-Victoria Solid Waste Management Region:

- There are at present an estimated 38,180 residents and 12,533 households in the Carleton-Victoria Region.

- There are 29 waste dump sites located throughout the Region, 9 are municipally operated, 17 are operated by NBDOT and 3 are privately owned and operated.

- An estimated 12,909 tonnes of waste are generated by residents of the Region, of which 265 tonnes are recycled, and 12,644 tonnes are disposed of at local municipal and NBDOT dump sites.

- An estimated 20,066 tonnes of industrial, commercial and institutional (ICI) wastes are generated in the Region, of which 17,611 tonnes are disposed of at local dump sites. The remaining 2,455 tonnes of ICI wastes are recycled. Sawmills produce approximately 232,000 tonnes of woodchips and hog fuel by-products, which are now remarketed, and approximately 31,000 tonnes of wood wastes are retained on-site. An estimated 9,600 tonnes of potato waste are plowed under and/or landfilled on the farms.

- In total an estimated 32,975 tonnes of waste are generated by residents and the ICI sectors in the Carleton-Victoria Region. Of this, 20,255 tonnes of wastes are disposed of at local dump sites and 2,720 tonnes of residential and ICI waste materials are recycled.

- The budgeted operating costs of the public dump sites, municipal and provincial, for the Region in 1992 are $354,870. Residential waste collection costs at present have been estimated at $1,201,800 for the Region.

- Growth in solid waste generation is forecast to be equivalent with growth in population, at 0.5 % per annum to over 32 thousand tonnes by year 2016.

1.0 INTRODUCTION

The New Brunswick Department of the Environment (NBDOE) has identified twelve solid waste management regions throughout the province. Each Region is actively engaged in the province-wide program process aimed to replace existing local dump sites with regional environmentally controlled waste disposal systems. Only two Regions as yet have regional solid waste management systems in operation, Fredericton and Nepisiguit-Chaleur. Two more regions have completed the site Environmental Impact Assessment (EIA) phases and have begun design of sanitary landfill sites tentatively scheduled for construction this upcoming season. The remaining regions are involved in varying stages of the planning process - waste audit and alternatives, site selection, EIA, design and construction. Figure 1.1 illustrates the general stages of the regional waste management planning process.

The Carleton - Victoria Solid Waste Region is the last in the Province to begin the regional waste management planning and development process. A provisional committee, formerly the Carleton-Victoria Solid Waste Region Provisional Committee and recently renamed the Valley Solid Waste Commission, was established in the early part of 1991. The Commission is composed of representatives from the Region's municipalities, local service districts (LSD's), and Indian Nations to facilitate local public involvement and decision making. The mandate of the Commission is to carry out the tasks necessary to develop an environmentally and socially acceptable strategy suited to the Region, which is both economical and effective in meeting present and future waste management requirements. One of the principal responsibilities of the Commission is to authorize and direct planning studies conducted to support the development and implementation of a solid waste management plan.

Phase I: A Waste Audit, is the first of a two phase study. This report provides the Valley Solid Waste Commission with information on the extent and distribution of existing and future wastes generated, as well as the existing methods of solid waste handling and disposal in the Region. This information is required to assess potential waste management alternatives and to ensure they are tailored to the magnitude and nature of waste production in the Carleton - Victoria Region. The report also documents the present practices and costs of waste handling and disposal in the Region. Phase II:

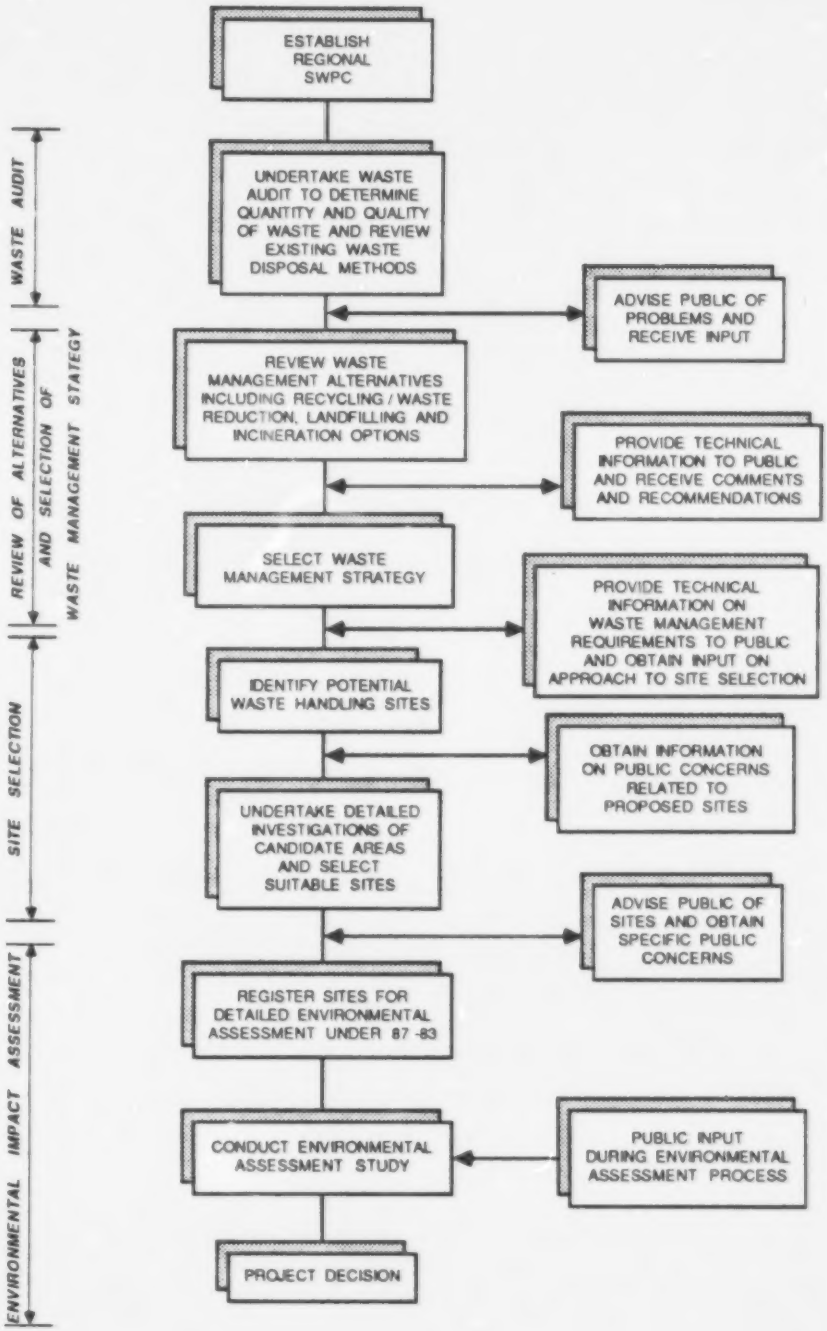

ESTABLISH REGIONAL SWPC
UNDERTAKE WASTE AUDIT TO DETERMINE QUANTITY AND QUALITY OF WASTE AND REVIEW EXISTING WASTE DISPOSAL METHODS
ADVISE PUBLIC OF PROBLEMS AND RECEIVE INPUT
REVIEW WASTE MANAGEMENT ALTERNATIVES INCLUDING RECYCLING / WASTE REDUCTION, LANDFILLING AND INCINERATION OPTIONS
PROVIDE TECHNICAL INFORMATION TO PUBLIC AND RECEIVE COMMENTS AND RECOMMENDATIONS
SELECT WASTE MANAGEMENT STRATEGY
PROVIDE TECHNICAL INFORMATION ON WASTE MANAGEMENT REQUIREMENTS TO PUBLIC AND OBTAIN INPUT ON APPROACH TO SITE SELECTION
IDENTIFY POTENTIAL WASTE HANDLING SITES
OBTAIN INFORMATION ON PUBLIC CONCERNS RELATED TO PROPOSED SITES
UNDERTAKE DETAILED INVESTIGATIONS OF CANDIDATE AREAS AND SELECT SUITABLE SITES
ADVISE PUBLIC OF SITES AND OBTAIN SPECIFIC PUBLIC CONCERNS
REGISTER SITES FOR DETAILED ENVIRONMENTAL ASSESSMENT UNDER 87-83
CONDUCT ENVIRONMENTAL ASSESSMENT STUDY
PUBLIC INPUT DURING ENVIRONMENTAL ASSESSMENT PROCESS
PROJECT DECISION
WASTE AUDIT
REVIEW OF ALTERNATIVES AND SELECTION OF WASTE MANAGEMENT STATEGY
SITE SELECTION
ENVIRONMENTAL IMPACT ASSESSMENT

FIGURE 1-1
APPROACH TO DEVELOPMENT OF A COMPREHENSIVE WASTE MANAGEMENT STRATEGY

An Assessment of Waste Management Alternatives will examine the options and costs of regional systems available to the Carleton - Victoria Region for assessment by the Commission and the public in selecting an optimal regional waste management system. It will be completed and presented subsequent to this **Phase** I report.

1.1 Approach

The primary objectives of this waste audit study have been identified in the Terms of Reference. The Phase I: The Waste Audit Study is to identify:

1. waste types, quantities and generators;
2. existing waste collection and transportation systems and disposal sites;
3. existing recycling, composting and salvaging operations;
4. projected population growth; and
5. factors which may affect future waste management alternatives, decisions or costs.

A waste audit provides a "snap-shot" of existing circumstances and is simply a status report on the present levels, composition and distribution of wastes generated in the Region, as well as the current practices and costs of waste handling, disposal and diversion. As such, the waste audit does not evaluate or make judgements regarding current waste handling practices, not does it provide any alternatives. Instead it provides the necessary data and information base for assessing future alternatives available and appropriate to the Region under a regionalized waste management system, as will be reported in the Phase II - Assessment of Alternatives. Population and waste generation levels are projected on the basis of historic population levels per zone of the Region, subject to and qualified by any known or speculated factors foreseen as potentially affecting future regional waste generation levels.

The general approach taken in conducting this waste audit has been to utilize known existing waste generation rates and composition data, where available and applicable to the Carleton - Victoria Region. Rural area and small urban area residential waste generation rates have been applied using recent data acquired from the only two active regional systems which keep waste weigh-in records at their sites, the Fredericton Solid Waste Management Region and the Nepisiguit - Chaleur Solid Waste Management

Region. Waste composition proportions have been adapted from very expensive and comprehensive waste sampling surveys conducted in various Canadian locations to produce waste generation and composition rate standards. These surveys involve actual randomized on-site statistical analysis, classification and weighing of types of wastes arriving at the site.

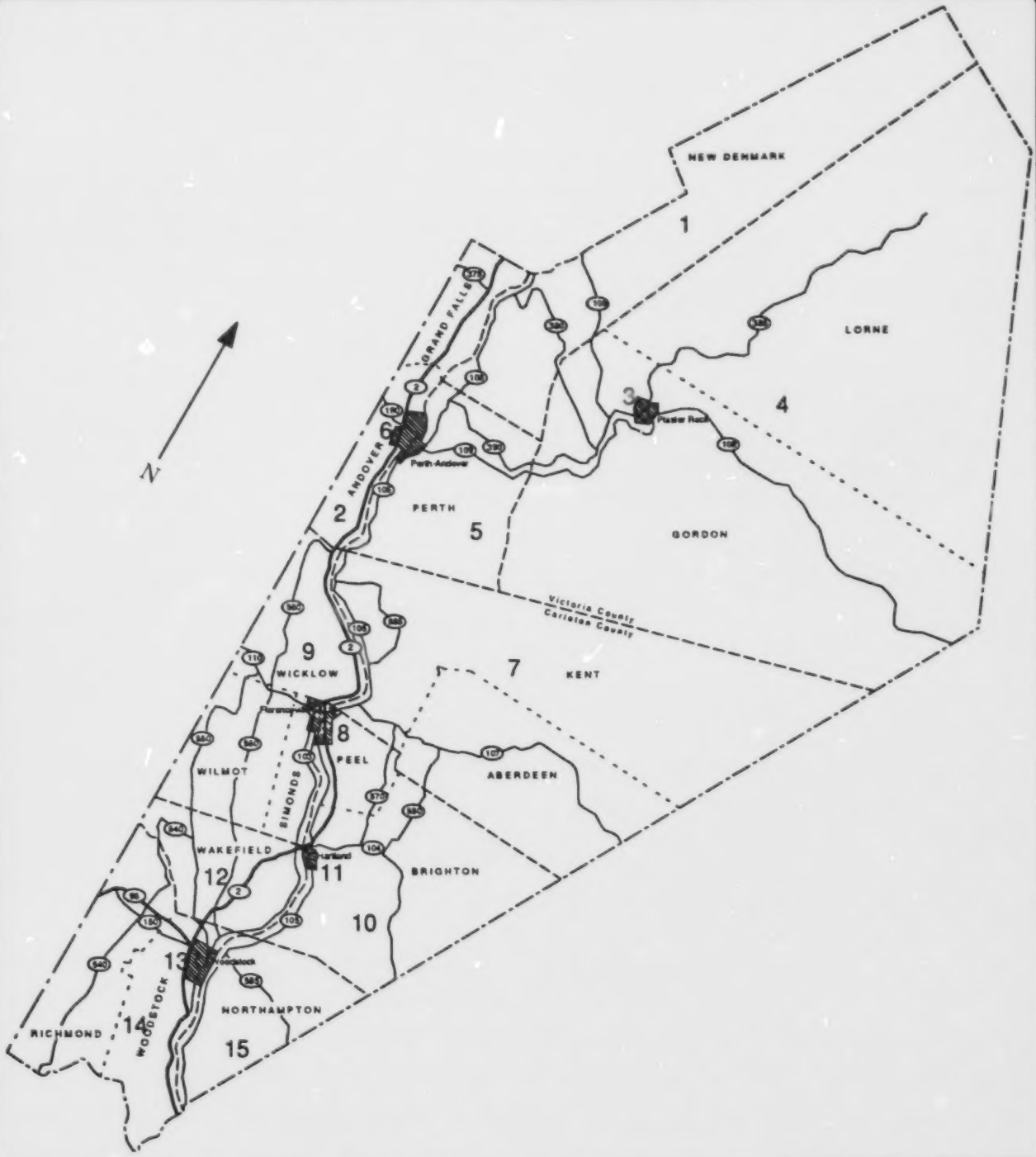
These standard waste generation and composition rates and data have been supplemented by information attained directly from within the Region. A representative cross-section of industrial, commercial and institutional (ICI) waste generators in the Carleton - Victoria Region has been selected and surveyed. Factors have been developed to produce sectoral totals, based on waste generation levels acquired from surveyed firms versus the total number of firms per industry sector. To protect confidentiality of private interests, most information has been provided only in industry aggregate form in this report.

The waste audit also included visitations to all municipal and some other rural dump sites located in the Region to provide an overview summary of their present status and conditions. Waste disposal and handling costs have been acquired from the dump site operators, ICI waste generators and local waste haulers.

1.2 Study Area and Waste Generation Zones

Figure 1.2 provides a map of the Carleton - Victoria Solid Waste Management Region study area as defined in the Terms of Reference. The Carleton - Victoria Region encompasses all of Carleton County and the large portion of Victoria County located south of the Grand Falls and Parish of Drummond area, which was included in the Madawaska - Victoria Region. According to 1986 Statistics Canada data, the total population of the Carleton - Victoria Region was 37,325 with 12,258 residential households.

Figure 1.2 also indicates the Study Area waste generation zone structure and numbering system utilized in this Phase I - Waste Audit and in the subsequent Phase II - Assessment of Waste Management Alternatives. The zones were selected on the basis of parish and municipal boundaries, as available from Statistics Canada census subdivision breakdowns.



Legend:

- Trans Canada Highway
- Collector Highway
- 15 Solid Waste Generation Zone Number
- Solid Waste Generation Zone Boundary
- County Boundary
- Parish Boundary
- Municipal Solid Waste Generation Zone

Drawing Title:	FIGURE 1.2 STUDY AREA
Project Title:	CARLETON - VICTORIA REGION WASTE AUDIT
FGA FIANDER-GOOD ASSOCIATES LTD.	Date: 03/1992
Scale: Not to Scale	Drawn By: JTGB
	Project No: 521-23

Table 1.1 presents the distribution of population and households, as acquired from the 1986 Statistics Canada Census data and indicates the parishes and municipalities included in each waste generation zone. The 1992 population and households have been estimated on a per zone basis for use in this study to reflect present levels.

The Carleton - Victoria Region is largely a rural population with about 32 percent living within the nine relatively small incorporated municipalities of the Town of Woodstock, Town of Hartland, Village of Florenceville, Village of Centreville, Village of Bristol, Village of Bath, Village of Perth-Andover, Village of Aroostook and Village of Plaster Rock. Over two-thirds of the population live in the rural unincorporated areas, ie. local service districts (LSD's), of the Region.

The principal industries of the Carleton - Victoria Region are in the primary and secondary agriculture and forestry sectors. Tourism (particularly outfitting) and various manufacturing industries are also present in the Region.

TABLE 1.1
STUDY AREA WASTE GENERATION ZONES - POPULATION AND HOUSEHOLDS

Waste Generation Zones #	Description		1986 Population	1986 Households	1992 Estimated Population	1992 Estimated Households
1	Denmark	P	1,800	575	1,816	580
2	Grand Falls	P (1)	866	263	866	263
	Andover	P	1,123	345	1,189	365
	Aroostook	V	403	150	403	150
	Sub-total		2,392	758	2,459	778
3	Plaster Rock	V	1,232	460	1,232	460
4	Lorne	P	728	230	728	230
	Gordon	P	1,952	610	1,952	610
	Sub-total		2,680	840	2,680	840
5	Perth	P	1,361	430	1,402	443
	Tobique 20	R	542	165	554	169
	Sub-total		1,903	595	1,955	611
6	Perth-Andover	V	1,889	705	1,889	705
7	Kent	P	2,448	745	2,448	745
	Aberdeen	P	1,192	380	1,192	380
	Bath	V	738	260	738	260
	Bristol	V	770	260	770	260
	Sub-total		5,148	1,645	5,148	1,645
8	Florenceville	V	725	255	725	255
9	Wicklow	P	1,806	555	1,882	578
	Wilmot	P	1,210	360	1,210	360
	Simonds	P	589	185	616	194
	Centreville	V	543	200	547	201
	Sub-total		4,148	1,300	4,255	1,333
10	Brighton	P	1,825	555	1,945	592
	Peel	P	1,252	385	1,252	385
	Sub-total		3,077	940	3,197	977
11	Hartland	T	917	310	917	310
12	Wakefield	P	2,506	775	2,709	838
13	Woodstock	T (2)	4,824	1705	4,824	1,705
14	Woodstock	P (2)	1,530	600	1,656	650
	Richmond	P	1,181	370	1,264	396
	Woodstock	R	142	40	142	40
	Sub-total		2,853	1,010	3,062	1,085
15	Northampton	P	1,231	385	1,312	410
	Total		**37,325**	**12,258**	**38,180**	**12,533**

Notes:
(1) Includes only the southern part of the parish.
(2) Adjusted due to a recent change in boundaries.

2.0 STUDY APPROACH OVERVIEW

2.1 Background

There are several ways to conduct residential and industrial, commercial and institutional (ICI) waste audits. The choice of methods depends on the level of precision required, the extent of waste generators, and perhaps foremost of all, the budgetary limitations to conduct the audit.

On the upper end of the scale are controlled statistical waste audits. These types of waste audits involve random sampling of weighed-in waste truckloads of residential waste at disposal sites, from which the number of households served are related to the amount of waste generated. These truckloads are sampled regularly throughout a year to account for seasonality. Each truckload is dumped and the entire waste contents are separated into waste categories, and weighed. The sampled volumes of waste recorded throughout the year are totalled and equated with the actual total volume of incoming waste recorded by the disposal site weigh scales. The result of this residential waste audit is the total average waste production per capita and per household for the service area, as well as the average composition of waste materials generated as part of the total residential waste stream.

Accompanying the statistical residential survey would be a similar type of sample survey of ICI waste delivery vehicles throughout a year. The sample size of ICI vehicles surveyed, has to be large enough to capture the range of industries and businesses involved. Care must be taken to identify sources of the ICI wastes. The survey would be supplemented by a comprehensive industrial, commercial and institutional profile of the disposal site service area for use in the factoring process.

Together these surveys cost several hundreds of thousands of dollars. So not surprisingly, they are few in number. In the final analysis, these statistical waste audit studies have had similar results, particularly in the residential waste stream. People in this Canadian and North American society on average generate similar quantities and types of waste. So there is no need to "reinvent the wheel", to develop a useful information base for planning. Instead these detailed studies have commonly been used

as guidelines and support documentation to most studies, with more limited budgets and less need for precision in terms of waste composition. Such is the case with the regional waste audits conducted throughout New Brunswick, and this one for the Carleton - Victoria Region.

It should be noted that none of the dumps in the Carleton - Victoria Region presently weigh incoming garbage. Although estimates of waste volumes were offered from the New Brunswick Department of Transportation dump site operators, these estimates were not provided with any level of certainty. So they have been used only as bench marks in the analysis. Most municipal dump operators had no idea of the quantity of wastes disposed at their sites.

This waste audit has, therefore, been designed and conducted as proposed in the Study Proposal, to effectively combine secondary resource data and known waste production rate parameters with a series of complementary primary data surveys specific to the Carleton - Victoria Region. The result of this approach has been to produce a reasonable estimation of present and future waste generation, waste composition, and waste distribution, as well as a profile of waste disposal, collection and recycling practices, within a reasonable study budget and time frame for use as the basis of evaluating waste management alternatives appropriate to the Region.

The study proceeded with the following surveys prior to the analysis and reporting of results:

1. A secondary research survey of secondary data and information contained in various solid waste management statistics, studies and research activities reports, as well as industrial and commercial directories and statistical publications of the Carleton - Victoria Region.

2. A primary survey of public and private individuals and agencies presently engaged in the various waste handling activities in the Region.

3. A field observational survey of the characteristics and condition of the existing waste dump sites located throughout the Region.

4. A secondary research survey of population and households statistics and residential waste generation statistics and studies in New Brunswick.

5. A primary survey of a representative sample of ICI firms strategically selected to determine regionally specific wastes generated by the economic sectors.

The procedures and participants in each of these surveys are outlined below. The results and analysis from these surveys are reported in the ensuing chapters of this report.

2.2 Secondary Resources Survey

The first step in this waste audit was to obtain and examine the demographic and economic characteristics of the Carleton - Victoria Region. Demographic information was obtained from Statistics Canada. The household and population data and the municipal boundaries were used to determine appropriate waste generation zones. The base demographics of the Region were reported in Chapter 1.0, and used again for the population and waste generation forecasts presented in Chapter 6.0.

Industrial and Commercial directories produced by the Regional Development Commissions, as well as telephone directories, were acquired for use in the ICI survey sample selection. Solid Waste Management Region Waste Audits conducted in New Brunswick and throughout Canada and elsewhere were consulted. In general, all background information necessary to conduct this waste audit was assembled. Appendix A presents a list of the reference documents used in this study.

2.3 Operational Surveys Component

All nine municipalities, as well as the seven active Local Service Districts (LSD's), were interviewed to determine the nature and extent of their participation and practices in waste handling. Of particular importance these interviews acquired information regarding the methods and costs of the dump site operations. Copies of the personal interview questionnaires used for the municipality and LSD surveys are provided in Appendix B. Table 2.1 presents the list of municipal and LSD contacts interviewed, as

TABLE 2.1
CARLETON-VICTORIA REGION
LIST OF CONTACTS

Community and Other Government Agencies:

Town of Woodstock (Woodstock)	Mr. Ed Dickinson (328-3307)
Town of Hartland (Hartland)	Ms. Judy Dee (375-4357)
Village of Florenceville (Florenceville)	Mr. Gordon Blackie (392-5264)
Village of Centreville (Centreville)	Ms. Kathleen Simonson (276-3627)
Village of Bristol (Bristol)	Ms. Nancy Shaw (392-6013)
Village of Bath (Bath)	Mr. Walter Feeney (278-5293)
Village of Perth-Andover (Perth-Andover)	Mr. Murray Watters (273-2235)
Village of Aroostook (Aroostook)	Ms. Dorothy Boone (273-6443)
Village of Plaster Rock	Ms. Barb Wishart-Fawcett (356-2653)
Benton L.S.D.	Mr. John Bolger (272-2901)
Northampton L.S.D.	Ms. Janice Bull (328-3543)
Somerville L.S.D.	Mr. Roland Perry (375-6256)
Coldstream L.S.D.	Mr. Weldon Trecartin (375-6600)
Glassville L.S.D.	Mr. Joe McBrine (246-5267)
Lakeville L.S.D.	Mr. James Graham (276-3267)
Aberdeen L.S.D.	Mrs. Bonar Brown (246-5492)
Grand Falls Region Development Commission (Grand Falls)	Mr. Michael Poitras (473-4994)
Carleton Region Development Commission (Woodstock)	Mr. Gordon Roach (328-9983)
N.B. Dept. of Municipalities, Culture, and Housing (Woodstock)	Mr. Ed Currie (325-4420)
N.B. Dept. of Transportation (Woodstock)	Mr. Grenville Greer (325-4444)
N.B. Dept. of Transportation (Perth-Andover)	Mr. Herman Van Kessel (273-2242)
N.B. Dept. of Environment	Mr. Roger Maillet (457-4848)
Agriculture Canada (Benton Ridge)	Dr. Robert Horseman (272-2072)
Agriculture Canada (Fredericton)	Dr. Richard Karne (452-3260)
N.B. Dept. of Natural Resources (Fredericton)	Ms. Edith Cogswell (453 2440)
N.B. Dept. of Agriculture (Wicklow)	Mr. Jack Burnham (392-6007)
N.B. Dept. of Agriculture (Grand Falls)	Mr. Lionel Arsenault (473-5515)
N.B. Statistics Agency (Fredericton)	Ms. Janine Bringloe (453-2381)

well as other government agencies consulted for various information throughout the study.

Dump site operators (ie. the municipalities and the New Brunswick Department of Transportation (NBDOT) District #7 in Woodstock and District #11 in Perth-Andover) were interviewed to establish municipal and rural site operations and costs. Waste haulers and recyclers were also interviewed to determine waste collection and recycling operations and costs. Table 2.2 provides the list of waste haulers and recyclers interviewed for the study. Copies of the guideline questionnaires used to interview dump site operators, waste haulers and recyclers are also provided in Appendix B. The results of these surveys are reported in Chapters 3.0 and 5.0 of this report.

2.4 Dump Site Field Surveys

Mapped locations of the 29 provincial, municipal and privately operated dump sites in the Carleton - Victoria Region were obtained from NBDOE. All nine of the dump sites operated and utilized by the municipalities, as well as some of the NBDOT dumps, were visited. Their various characteristics and general conditions were recorded. In addition, NBDOE records of the dumps in the Region were reviewed. The results of this survey are presented in Chapter 3.0. Appendix C illustrates the visual appearance of some of the dump sites in the Region.

2.5 Residential Waste Audit Survey Component

The residential waste audit method used in this study incorporates residential waste volume generation rates data available from New Brunswick landfill sites with documented waste composition information from a recent 1990 detailed statistical residential waste audit conducted in Guelph, Ontario. No such study has been conducted in New Brunswick, except a 1979 study conducted by Bird and Hale, which surveyed all wastes generated in Saint John, but did not separate residential from ICI wastes.

The Fredericton Solid Waste Commission and Nepisiguit-Chaleur Solid Waste Commission operate the only two active regional solid waste landfill sites in the Province which weigh in all waste tonnages. Their residential waste generation rates for their

TABLE 2.2

CARLETON-VICTORIA REGION

WASTE HAULERS AND RECYCLERS SAMPLE - LIST OF CONTACTS

Waste Haulers and Recyclers:

Kearny's Hygenic (Woodstock)	Mr. Peter Morin (328-6139)
W.F. Rideout & Sons Trucking (Hartland)	Mr. W.F. Rideout (375-6188)
Mr. Gilbert Trecarten (Hartland)	(375-8400)
Mr. Lewellyn White (Tracey Mills)	(276-4556)
Mr. Gladwyn Piper (Knoxford)	(276-4869)
Mr. Donald Logue (Bristol)	(278-5314)
Mr. Willard Giberson (Bath)	(278-3234)
Gee's Trucking (Perth-Andover)	Mr. Jon Gee (273-6572)
Carleton County Recycling (Woodstock)	Mr. George Peabody (325-9067)
Woodstock Recycling (Woodstock)	Mr. Peter Morin (328-6139)
Victoria County Recycling (Perth-Andover)	Ms. Karen Garnett (273-2660)

smaller urban communities and rural areas have been used in the estimation of residential waste generation levels in the Carleton - Victoria Region. These data sources have been equated with the Carleton - Victoria Region zone populations to provide the total residential wastes, as well as the distribution of wastes generated throughout the Region.

Figure 1.2 of Chapter 1.0 illustrated the geographic size and distribution of the 15 waste generation zones designated for planning purposes in the Carleton - Victoria Region. Similarly, Table 1.1 presented the actual 1986 and estimated 1992 populations and households per zone throughout the Region. The 1992 estimates provide the basis for all residential waste volume estimates produced in this report. The results of this survey and analysis are reported in Chapter 4.0.

2.6 ICI Waste Audit Component

The ICI waste audit method used in this study recognizes that the industry sector, particularly, and to a lesser extent the commercial and institutional sectors are unique to the area. So known average waste generation rates and waste material composition per economic activity attained from other sources and studies have been complemented by a questionnaire survey of a sample of ICI establishments located throughout the Carleton - Victoria Region.

A total sample of 38 firms, 23 industrial, 7 commercial, and 8 institutions, were selected for interviewing and presented and approved at the January 28th meeting of the Valley Solid Waste Commission. Proportionally less commercial firms were included in the sample because commercial waste generators (eg. service stations, confectionaries, hotels, retail stores, restaurants, etc.) are typically better known and more consistent than the less predictable industrial producers, which have more unique types and volumes of waste. An introductory letter was drafted and approved and then sent to each of ICI firms in the sample alerting them to the general regional waste management process and their pending waste audit interview. A telephone interview questionnaire was designed (see Appendix B) and the survey conducted.

Industrial and commercial and telephone directories were used to determine the total number of each class of firm and the zone of its location. The findings from the ICI

survey as well as the known commercial waste generation rates, were equated to the entire number and type of ICI firms of the Region. The waste generation levels were then factored to the total per zone and the waste material composition averaged on a sectoral basis.

Table 2.3 presents the list of contacts of the industrial, commercial and institutional waste generators included in the sample survey. In total, 34 of the total 38 firms contained in the survey sample were able to be contacted and agreed to be interviewed. The results of this survey and analysis are reported in Chapter 4.0.

TABLE 2.3
CARLETON-VICTORIA REGION
ICI SURVEY SAMPLE - LIST OF CONTACTS

Industrial:

Basic Industrial Design (Woodstock)	Mr. Ray Sullivan (328-4381)
Haines Manufacturing (Perth-Andover)	Mr. Gary McLaughlin (273-3870)
Carleton Cooperative (Florenceville)	Mr. Randy Ferguson (392-5587)
Maine & N.B. Electric Power Co. (Tinker)	Mr. Alton Walker (273-2935)
Covered Bridge Printing (Hartland)	Mr. Stewart Fairgrieve (375-4458)
Linton Enterprises (Arthurette)	Mr. Tim Linton (356-2153)
Juniper Lumber Co. (Juniper)	Mr. J.B. O'Keefe (246-5611)
Jensen Brothers Ltd. (New Denmark)	Mr. Kevin Jensen (553-6733)
EFKA Canada Ltd (Woodstock)	Mr. Ted King (328-4301)
McCain Foods Ltd. (Florenceville)	Mr. Eric Ritchie (392-5541)
Humpty Dumpty Foods Ltd. (Hartland)	Mr. Ronald Ward (375-4474)
Brunswick Animal Bedding (Plaster Rock)	M. Andre Laurion (356-7462)
Thomas Equipment (Centreville)	Mr. Rick Weaving (276-4511)
Karnes Kitchen Ltd. (Woodstock)	Mr. Patrick Karnes (328-3312)
C.A. Hunter & Sons Ltd. (Florenceville)	Mr. Clarence Hunter (392-8196)
Graham Farms Ltd. (Good Corner)	Ms. Graham (276-3257)
BWS Manufacturing (Centreville)	Mr. Randy McDougall (276-4567)
Fraser Inc. (Plaster Rock)	Mr. Dave Corbin (356-8824)

Commercial:

Carleton Mall (Woodstock)	Mall Manager (458-9226)
Andover&Perth U.F. Co-op (Perth-Andover)	Mr. Clifford Mulroy (273-2221)
Day & Ross Ltd. (Somerville)	Mr. Leonard Slipp (375-4401)
Carls Electric Ltd. (Aroostook)	Mr. Carl Morell (273-3948)
N.B. Outfitters Association (Doaktown)	Mr. Alex Mills (365-2253)
Courtyard Developments Ltd. (Hartland)	(375-4005)
Carr's Septic Tank Cleaning (Woodstock)	Mr. Charles Carr (328-8482)

Institutional:

District 31 School Board (Perth-Andover)	Mr. John Green (273-2287)
District 30 School Board (Perth-Andover)	Mr. Charles Corcoran (392-6949)
District 29 School Board (Woodstock)	Mr. Michael Darrah (325-4432)
Bath Medical Clinic (Bath)	(278-5200)
Carleton Memorial Hospital (Woodstock)	Ms. Lynn Slipp (328-3391)
Victoria Glen Manor (Perth-Andover)	Mr. John Inman (273-6861)
Carleton Manor (Woodstock)	Mr. Meryll Cox (328-8819)
Perth Medical Clinic (Perth-Andover)	Dr. Peter Moore (273-3558)
New Brunswick Community College (Woodstock)	Mr. Willis Brown (325-4400)

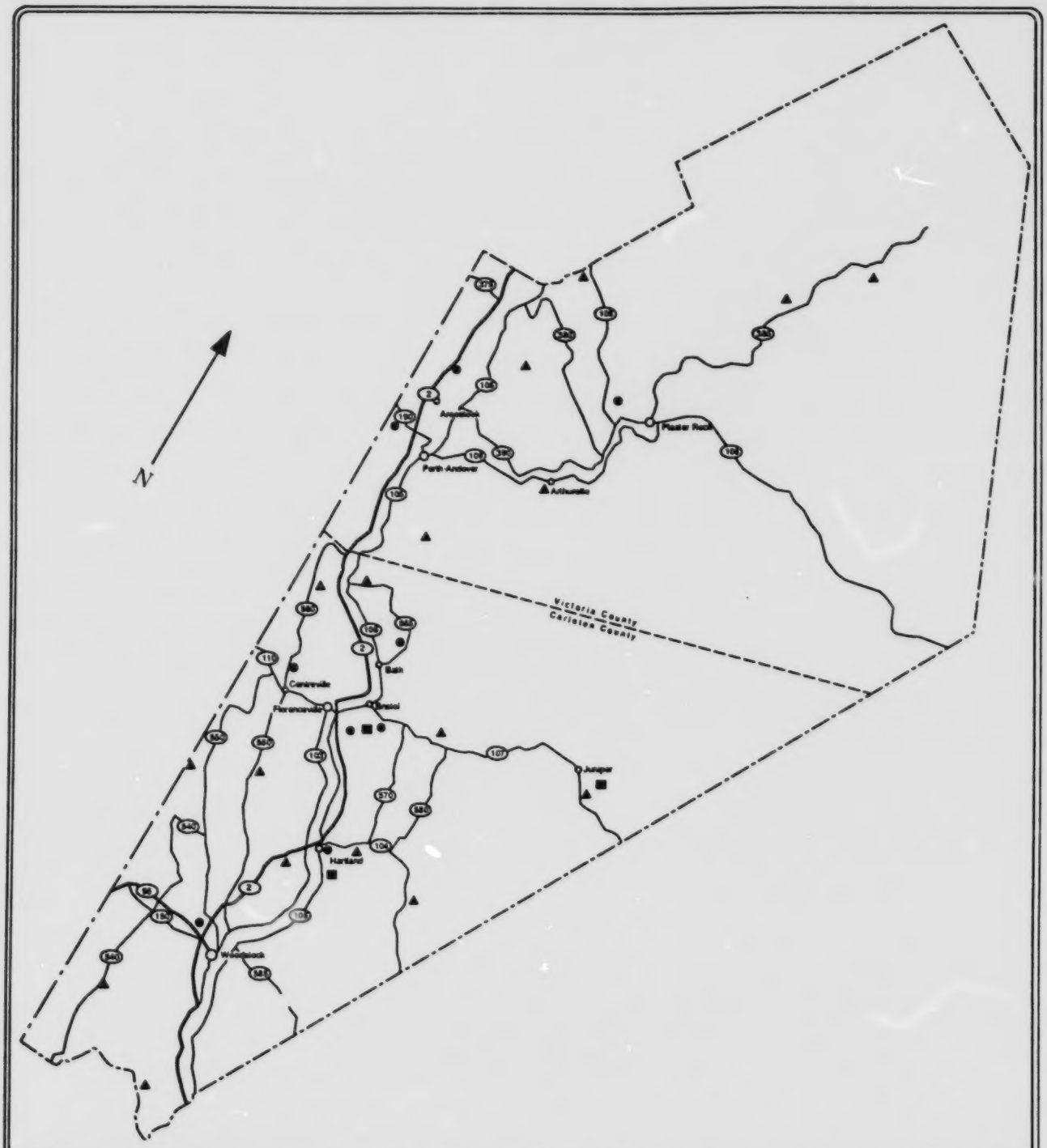
3.0 PROFILE OF EXISTING WASTE HANDLING PRACTICES

It is interesting that the most common reaction when people are asked how much waste their firm or municipality produces, and how it is handled, is one of uncertainty and even some embarrassment. That is not to say that the reaction is due to any wrong doing. Quite to the contrary, it is that they often simply do not know off-hand exactly how their wastes are handled, how much is generated and what it costs. After some further consideration, tracing through the sequence of steps, they realize they have taken the whole process for granted (ie. from their trash can at their desk to a custodian's bay, on to a container in the back parking lot, picked up by a garbage collector weekly and dumped at a local dump just out of ordinary view) and in fact had never really considered the whole waste handling process. This is the reaction encountered from our experience throughout New Brunswick and was only slightly less common in the Carleton - Victoria Region. With the movement towards regionalized waste management and media attention to environmental issues, however, people are increasingly becoming more aware of their waste management practices and how they may change in the future.

This chapter reports the summary findings from the surveys of participants of the various waste management practices and systems operations, as they exist at present throughout the Carleton - Victoria Region.

3.1 Existing Dump Site Locations

Currently there are 29 active dump sites in the Carleton - Victoria Region. Of these, 17 are maintained by the Department of Transportation and 9 by municipalities. The remaining three sites located in the Hartland, Florenceville and Juniper areas are privately owned and operated and serve industrial firms. Figure 3.1 illustrates the location of these sites within the Region and their relative position among the existing road network and various municipalities.



Legend:

- Trans Canada Highway
- Collector Highway
- County Boundary
- ▲ DOT Operated Dumpsite
- ■ Privately Operated Dumpsite
- ● Municipally Operated Dumpsite

Drawing Title:	FIGURE 3.1 DISPOSAL SITE LOCATIONS
Project Title:	CARLETON - VICTORIA REGION WASTE AUDIT
FGA FIANDER-GOOD ASSOCIATES LTD.	Date: 03/1992
Scale: Not to Scale	Drawn By: JTGB
Project No:	521-23

3.2 Waste Practices by Municipalities and LSD's

3.2.1 Waste Disposal

All of the municipalities of the Carleton - Victoria Region operate their own dump sites. Most of them contract out all or part of the maintenance and supervisory operations of their site. No gate fees are imposed and site operations are included in their municipal operating budgets and paid through residential and commercial property taxes. The municipalities, with the exception of Hartland, are also compensated by the Provincial Government for allowing adjacent rural communities use of their municipal dump site. NBDOT pays $8.28 per capita for rural unincorporated area populations served by municipal dump sites to the respective municipalities. This has served as a practical measure to reduce the need for additional NBDOT operated dump sites to serve these rural areas.

3.2.2 Waste Collection

Bath, Bristol, Florenceville and Plaster Rock provide residential waste collection as part of their municipal services to all residents. Bristol and Plaster Rock extend collection services to several smaller commercial and institutional waste generators of their municipalities. Bath, Bristol and Florenceville contract out weekly residential waste collection services to local private waste haulers, while Plaster Rock provides weekly waste collection service by its own staff. The other municipalities leave the onus on their residents to either haul their own wastes to the site, or individually solicit private waste haulers to collect and deliver their wastes to the dump site.

There are no community waste collection services in the rural areas offered as part of the LSD services. Most residents outside of the incorporated municipalities deliver their own wastes to their local dump site. Some in areas adjacent to the municipalities solicit a private waste hauler's services to collect and haul away their wastes. For instance, a significant portion of Kearney's residential waste collection services are extended to residents just outside of the Town of Woodstock.

3.2.3 Waste Recycling

The Town of Woodstock, the Village of Bath, and most recently, the Village of Perth-Andover support recycling programs within their community. Woodstock residents are provided a full-scale blue-box recyclable collection service from Carleton County Recycling. The Town provided funding support to the amount of $3,500 for the initial set up of the Blue Box program.

The Village of Bath requires residents to keep glass bottles and aluminum cans separated from the rest of the garbage, as part of their waste collection service. Rural resident users are required to do the same prior to dumping their wastes at the site. Bins are set out near the site gateway for deposit of recyclables prior to dumping wastes.

Perth-Andover residents have just recently begun being served with a drop-off depot recycling program provided by Victoria County Recycling. The Village provides "in-kind" support to the program through provision of a municipally owned building to be used as the recycling depot at no cost for rent or utilities.

3.2.4 Waste Generation

Most of the municipalities generate their own wastes from their Town or Village administrative offices, as well as their various works and recreational service facilities. The Town of Woodstock generates approximately 800 cubic yards of waste per year from their public works, administration, fire station and police offices, sewage treatment plant, arena, campgrounds and streetside waste barrels. Wastes include mostly papers, food packaging and beverage containers, with some vehicle parts and petroleum product containers generated from the works garage and dry treated sludge from the sewage treatment plant.

The Village of Perth-Andover generates approximately 100 cubic yards of waste per year, mostly paper, food packaging and beverage containers and some mechanical and electrical parts, from its office, arena, library and works garage.

The Village of Bath generates approximately 40 cubic yards of waste per year, while the Village of Bristol generates about 75 cubic yards of waste. Both generate mostly paper and food packaging from their village offices.

The Village of Plaster Rock produces about 130 cubic yards of waste per year at its village office and fire station, as well as its works. Wastes generated are mostly paper and packaging, with some mechanical parts and containers.

The Town of Hartland generates approximately 115 cubic yards of waste per year at its town office, police station and arena, as well as its tourist centre in the summer. Again paper and food packaging dominate their wastes.

The Village of Florenceville does not have a village office or its own municipal works, and its administration is undertaken in the Village Clerk's own home. So it does not in itself generate wastes, which would not otherwise be accounted for in the residential or ICI waste stream.

The Villages of Aroostook and Centreville each have small offices in volunteer fire stations and do not have municipal works operations of their own. The Aroostook office and fire station produces about 6 cubic yards per year and the Centreville office and fire station about 12 cubic yards per year. Wastes are mostly paper with some food packaging.

Table 3.1 summarizes the waste generated by the municipal services converted to tonnages. Overall tonnages vary according to the composition of wastes generated by each municipality.

TABLE 3.1

WASTE TONNAGES AS GENERATED BY MUNICIPAL SERVICES

	ANNUAL WASTE TONNAGES
Town of Woodstock	75.0
Village of Perth-Andover	9.0
Village of Bath	4.0
Village of Bristol	7.0
Town of Hartland	10.5
Village of Plaster Rock	12.0
Village of Florenceville	0.0
Village of Aroostook	0.5
Village of Centreville	1.0
TOTAL MUNICIPAL SERVICES	**119.0**

3.3 Waste Collection Practices

Residential wastes generated in the Region are transported to various dump sites either by the residents themselves, or through the contracted services of private haulers. These haulers, mostly small operations, serve municipalities and outlying areas on the basis of a contract with either the municipality or the individual home owner. Similarly, ICI firms either deliver their own wastes to a dump site or contract a private hauler to perform the service.

Table 3.2 provides a summary of responses from the interviews with the waste haulers. It lists the name of each operator surveyed, the areas they serve, as well as the scope of their residential, ICI and recycling activities.

Kearney's Hygenic of Woodstock is the largest waste hauler in the Region serving from 800 to 1,000 households and approximately 150 non-residential establishments on a weekly and semi-weekly basis, using several compaction vehicles. The remaining haulers operate on a smaller basis, ranging from 75 to 300 households per week and from 5 to 35 non-residential stops, semi-weekly. These haulers generally use a one-half to one ton capacity non-compaction truck, some with dump boxes.

TABLE 3.2
WASTE HAULER INTERVIEWS - SUMMARY OF RESPONSES

Waste Hauler:	Kearney's Hygenic	W.F. Rideout & Son	G. Trecartin	D. Logue
Communties Served:	Town of Woodstock Woodstock Par(p), Richmond Par(p), Northampton Par(p), Wakefield Par(p)	Town of Hartland (p) Somerville L.S.D. (p) Brighton Par(p) Wakefield Par(p) Simonds Par(p)	Town of Hartland (p) Somerville L.S.D. (p) Brighton Par-Rockland Brighton Par-Bubarton Wakefield Par-Waterville	Village of Bristol 2 families outside Bristol
Dump Site:	Woodstock Municipal Site	Own site- E. Brighton Rd.	Hartland, Rosedale Lakeville, Rockland	Bristol dump only
# of Employees:	3	2	2	1- self
Age of Business:	40 yrs+	12 yrs	5 yrs	20 years in Dec/91
Vehicle(s) Type:	3 packers 1 one ton w/ dump 1 half ton w/ dump 1 three ton w/ dump	1 one ton	1 three-quarter ton w/ dump	1 half ton
Residential:	Yes	Yes	Yes	Yes
# of Stops:	800-1000	75-80 app.	100 app.	250-300
Frequency:	1 pickup/week	1 pickup/week	1 pickup/week	1 pickup/week
Trips:	2/day Resid.+Comm.	2/day Res+Comm (4/Fri)	4-5 trips/wk Res+Comm	5-13 w/ avg 6 loads/wk
Rate:	$7.00 / month	$1.50/wk/HH, ($1.75-rural)	$2.00/wk	municipal contract
Method of Pickup:	Roadside -all types	Rdside-all yards-seniors	Rdside usually -bags,boxes	Rdside-bags,boxes
Commercial:	Yes	Yes	Yes	Yes
# of Stops:	150 app.	15 app.	app. 10-15	5-6
Frequency:	1 pickup/day-grocer	1 pickup/day x 5 days/wk	once/day - twice/week	1 pickup/week
Trips:	2/day Resid.+Comm.	2/day Resid.+Comm. (4/Fri)	4-5 trips/wk Res+Comm	combined with residential
Rate:	$400-600/month	$30-50 /week	Depends on size of customer	if less than 50 lbs municipal contract
Recycling:	Yes	Not yet, but wld like to.	Yes	No
Types of Materials:	Cardboard Paper Aluminum Cans Oth Blue Box materials	Cardboard-Humpty Dumpty used to bale-now a firm from G and Falls bales and collects weekly	Keeps some alum cans. Used to keep paper but source stopped taking it to Hartland dump.	

TABLE 3.2 (cont'd)
WASTE HAULER INTERVIEWS - SUMMARY OF RESPONSES

Waste Hauler:	W. Giberson	L. White	G. Piper	J. Gee	W. Briggs
Communties Served:	Village of Bath Upper Kent Beechwood Giberson Settlement Monquart	Village of Centreville	Village of Centreville	Village of Perth-Andover Village of Aroostook	Village of Florenceville
Dump Site:	Bath Municipal	Centreville dump	Centreville dump	Carlingford (sometimes Four Falls)	Florenceville
# of Employees:	1- self	1-self (part time)	1-self (part time)	1-self + 1 part time	1-self (part time)
Age of Business:		2 years	2 months	15 yrs	
Vehicle(s) Type:	1/2 ton (w/ side brds + tarp)	1 half ton	1 one ton (w/ half ton capacity)	1 one ton	1 half ton
Residential:	Yes	Yes	Yes	No	Yes
# of Stops:	200	6	5		255
Frequency:	1 pick-up/week	1 pickup/week	1 pick-up/week - Sat		1 pick-up/week - Sat
Trips:		1 trip/week	1		
Rate:	Municipal contract	$2.00/week/HH	$4.00/wk (3.00/wk seniors)		Municipal contract
Method of Pickup:	Roadside- bags	Yard -bags	Yard- bags or boxes		Roadside-bags
Commercial:	No	Yes	No	Yes	No
# of Stops:		1- Gramma's Rest.		30-35	
Frequency:				4 days /week	
Trips:				2 trips/day	
Rate:		$15-16/week		$25-100/month	
Recycling:		No	No	No - but will be soon	No
Types of Materials:				Cardboard newspaper glass plastics	

Residential rates in the Region range from $1.00 to $4.00 per week per household. ICI rates vary with the volume of wastes and frequency of pick-up generally from around $5.00 to $10.00 up to $150.00 per week.

Approximately 84 percent of all residents in the Carleton - Victoria Region deliver their own waste to their local dump site. The cost of residential self-delivery of wastes ranges depending upon the distance travelled. In general, the NBDOE has assumed a cost of $2.00 per week per household throughout the Province assigned to this individual household task. This is based on an average return trip to the dump site of 8 kilometres at $0.25 per kilometre.

3.4 Local Dump Site Operations

The nine municipally owned and operated public dump sites in the Region are either trench and/or area fill dumps. None of the sites have leachate control or treatment facilities. Wastes are not measured at the gates, but all but Centreville are staffed at least part-time and usually year round. All have signs posted indicating disallowed wastes such as animal wastes, hazardous wastes, septic wastes, petroleum products, woodchips, and/or potatoes. Most have areas designated for large and bulky materials, such as car bodies, white goods, scrap metals, tires and construction materials. Site supervisors monitor materials entering the sites, and will reject non-permissible items.

Municipalities are compensated for those using their sites who live outside the municipal boundaries by the NBDOT. Some dumps have as few as five or less years of operational capacity remaining at their site location. The movement towards a regionalized waste disposal system will be timely for these municipalities.

The 17 NBDOT sites in the Region all employ a combination of trench/area fill landfilling with cover material applied at least twice yearly and usually monthly during the summer. Sites range in size from 2 to 10 acres, serving an average of 275 households. While most are currently less than half full, those at Juniper, Glassville and New Denmark are at 70 percent or more of their capacity, with a life expectancy of between 4 and 10 years. Most sites have a separate area for scrap metal, which, depending on the amount, are crushed and hauled away for scrap every two or three years. Burning occurs at all the sites, resulting in some complaints from nearby residents. Although

usually unsupervised, many are staffed during dry seasons when the risk of fire is high. NBDOT site operating costs range from $4,500 per year (Bloomfield) to $14,000 per year (Licford and New Denmark).

Table 3.3 presents various operating features of each municipal and NBDOT operated public dump site. Photographs of various dump sites in the Region, as acquired from on-site field observations this winter and supplemented by NBDOE files, are provided in Appendix C. Although the dump sites in the Carleton - Victoria Region are no picture of beauty, nor are they environmentally engineered, they are not unlike other municipal and rural dump sites found throughout the Province. In fact, they appear generally to be relatively well maintained. Regardless, according to Provincial policy all such local dump sites in the Province will be closed in the next few years and replaced by an environmentally and technically sound regional disposal facility or facilities.

All municipalities except Aroostook have municipal sewer services and sewage treatment facilities. Septic tank wastes are generally not allowed in the municipal or rural dump sites in the Region. Instead septic wastes are disposed within the Region at a NBDOE approved site near the Town of Woodstock dump site, or more commonly at the municipal sewage lagoons. A fee is charged (eg. $50 per tank load) in some cases. Based on the average household having its tank pumped out every 3 to 5 years approximately 1.0 to 1.4 million gallons of septic waste (75% water and 25% solid content) are generated in the Region per year. Some septic wastes from the Region are transported and dumped at the Nackawic pulp mill waste treatment facility.

There is no distinct Provincial policy for the disposal of hazardous or special wastes in the Carleton-Victoria Region, or elsewhere in the Province. Industry is responsible for disposing of their own hazardous wastes, under the direction and approval of NBDOE. Commonly, hazardous chemical wastes are temporarily stored in containers, then picked up and transported out of the Province for incineration in Quebec by private companies engaged in such services (eg. Laidlaw's or Tricel). Biomedical and pharmaceutical wastes and sharps generated by hospitals and medical clinics are either incinerated on site or transferred for incineration elsewhere.

TABLE 3.3
CARLETON-VICTORIA REGION DISPOSAL SITES - SUMMARY TABLE

Disposal Site:	Woodstock	Hartland	Florenceville	Centreville	Bristol
Authority:	Town of Woodstock	Town of Hartland	Village of Florenceville	Village of Centreville	Village of Bristol
Disposal Method:	Trench	Area Fill	Trench + Area Fill	Trench	Trench + area fill
Total/Excavated Area:	40 acres / 15 acres	120 acres / 2 acres	3 acres / .5 acres	3-4 acres / 1-2 acres	4 acres / 1.5 acres
Percentage Filled:	30-50	10	50	50-75	30-40
Life Expectancy-Yrs:	5	25+	10	3	5-10
Areas Served:	Woodstock, Upp Woodstock Jacksonville, Grafton, Northampton, Woodstock and Wakefield Parishes	Hartland	Florenceville, Stickney, Mt. Pleasant, Oakland some Bristol	Centreville, Good Corner, Long Sett., Tracy Mills, Royalton, Knoxford, Greenfield, Hartley Sett.	Bristol, Fielding, Gordonsville, Locharts Mill
Population:	8600	620	1900	1550	1400
Households:	2950	210	650	530	475
Waste Volume/Year:	49400 cubic yards				
ICI Wastes:	All types except animal wastes	Paper, Tires, Automotive parts, Restaurants	All except no petrolm products, dead animals, chemicals	Scrap metals, paper, wooden pallets, plastic	All except animal wastes, bulky materials, petrolm products
Hours of Operation:	Mon-Fri 12-6, Sat 8-6	Mon,Wed,Fri,Sat 9-6	40 hrs/wk Mon-Sat	24 hours	24 hours
Staffed:	Year Round	Year round	Year Round	No	part-time 15-20 hrs/wk
Cover Application:	monthly - 3 ft waste covered with 1 ft soil	as required, usually once/month	biweekly	bimonthly-winter wekkly-summer	
Annual Cost:	$75,000	$12,000	$23,600	$10,000	$5,200
Waste Separation:	Metals, tires, ashes	metals, wood, tires, ashes	Car bodies, white goods, tires	White goods, metals Car bodies	Wood, metals, car bodies
Recycling:	Metals, tires(occ)	metals, aluminum cans	Scrap metals, some clothing - by supervisor	No	
Fencing:	Yes	No	Full	No	No
Security Gate:	Yes	Yes	Yes	No	No
Road Signs:	Yes	Yes	Yes	Yes	Yes
Burning/Permitted:	Occasionally/No	Yes/Occasionally	Yes/Yes	Yes/No	No/Yes
Pest Control:	No - no problems	No - no problem	Burning	Yes - PCO	Yes - PCO
Oper&Maint Problems:	Occ. burning, roadside dumping, shortage of cover material	burning, some roadside dumping	No		Burning, control of what goes in
Public Concerns:	some concern about Meduxnekeag Stream contamination potential	Complaints of smoke	No	Some complaints about Dump pickers	Complaints of smoke, animal deposits

TABLE 3.3 (cont'd)
CARLETON-VICTORIA REGION DISPOSAL SITES - SUMMARY TABLE

Diaposal Site:	Bath	Carlingford	Aroostook	Plaster Rock	Coldstream
Authority:	Village of Bath	Village of Perth-Andover	Village of Aroostook	Village of Plaster Rock	DOT
Disposal Method:	Trench	Area Fill	Trench	Area Fill- embankment	Trench
Total/Excavated Area:	11 acres / 6 acres	80 acres / 4 acres	7 acres / 3 acres	5 acres / 5 acres	5 acres / 1 acres
Percentage Filled:	5-10	30	60-70	100	20
Life Expectancy-Yrs:	20	25	5-10	1-3	25
Areas Served:	Bath, Johnville, Holmesville, Beechwood	Perth-Andover, Kincardin, Hillandale, Turner Sett., Carlingford, Lower Perth, some Aroostook, Tinker	Four Falls, Morell Siding	Plaster Rock, ???	Hartland, Ashland, Coldstream, Bubartown, Mount Pleasant, Windsor East Coldstream
Population:	1660	3850	920	2770	
Households:	565	1360	320	970	700
Waste Volume/Year:					1825 tons
ICI Wastes:	No car bodies accepted	Scrap metals and other	Scrap metals and other	All except no Wood chips, pesticide cans, petroleum, dead animals, potatoes	Automotive parts Newsprint Fertilizer
Hours of Operation:	Tue-Sat:8-5(M-S:8-8 Summ)	Mon,Wed,Fri,Sat 8-5	Wed,Sat 9-5	24 hours	24 hours
Staffed:	Year Round	Year Round	Year Round	M,W,F-Full;T,Th-hrly chks	Fire Season Only
Cover Application:	bimonthly-more in summer	Major cover Spring & Fall soil cover as it fills in	once/yr in Spring	Twice per year	Yearly, with stockpiled ditching material using dozer
Annual Cost:	$27,000	$40,000	$8,000	$19,350	$7,000
Waste Separation:	White goods, tires	Tires, White goods, wood	White goods	White goods, car bodies	No
Recycling:	(something) returned in barrels to site	Sometimes metals are picked up for scrap	No	No	No
Fencing:	Full	Partial	Partial	Partial	No
Security Gate:	Yes	Yes	Yes	Yes - summer	No
Road Signs:	Yes	Yes	Yes	Yes	Yes
Burning/Permitted:	Yes/Yes - seldom	Yes/Yes	Yes/Yes	Yes/Yes - w\ DNR permit	Yes/Yes
Pest Control:	Yes - PCO	Yes - PCO	attendant poisons	Yes - PCO	Yes - PCO
Oper&Maint Problems:	No	smoke & blowing debris	some problem with rats blowing papers vandalism of building	Roadside dumping if gate closed	No
Public Concerns:	Complaints about gate	complaints of smoke	No	Complaints of smoke	Groundwater Cont. Fears Complaints of Smoke

TABLE 3.3 (cont'd)
CARLETON-VICTORIA REGION DISPOSAL SITES - SUMMARY TABLE

Disposal Site:	Benton	Glassville	Juniper	Kent Hill - Debec	Lakeville
Authority:	DOT	DOT	DOT	DOT	DOT
Disposal Method:	Trench	Trench	Trench	Trench	Trench
Total/Excavated Area:	3 acres / <0.1 acres	6 acres / 6 acres	5 acres / 3 acres	7 acres / <0.1 acres	2 acres / <0.1 acres
Percentage Filled:	10	80	75	10	60-70
Life Expectancy-Yrs:	10	5	10	10	5
Areas Served:	Benton	Glassville	Juniper	Debec, Kirkland, McKenzie Corner, Richmond Corner, some Woodstock	Lakeville, Wilmot, Avondale, Charleston, St. Thomas, Deerville, Jacksontwn, Williamstwn
Population:	150	600	700	1200	1000
Households:		400	400		400
Waste Volume/Year:	52 tons	573 tons	573 tons	260-364 tons	2300 tons
ICI Wastes:	Restaurant	Tires, Oil pails Metals	Tires, Oil pails Metals	Automotive parts Tires	Car bodies Other metals
Hours of Operation:	24 hours	20 hours/month	20 hours/month	24 hours	24 hours
Staffed:	No	Fire Season Only	Fire Season Only	No	No
Cover Application:	Yearly, with soil available near site using dozer	When full, trench is covered with fill using dozer; New trench dug	Monthly, dozer cleans trench and covers with fill	1-2 times/month as needed using small dozer	Monthly, with soil and once each summer with gravel using dozer
Annual Cost:	$7,000	$7,000	$7,000	$7,000	$6,000
Waste Separation:	Metals	Metals	Metals	Metals	Car bodies
Recycling:	No	No	No	No	Car crushing-every 3-4 years - to scrap dealer
Fencing:	No	No	No	No	No
Security Gate:	No	No	No	No	No
Road Signs:	Yes	Yes	Yes	Yes	Yes
Burning/Permitted:	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Pest Control:	Yes - PCO	Yes - PCO	Yes - PCO	Yes - PCO	Yes - PCO
Oper&Maint Problems:	Irregular maintenance in winter due to snow	No	No	No manpower/time to burn and maintain site during winter	No
Public Concerns:	Complaints of Smoke	No	No	No	No

TABLE 3.3 (cont'd)
CARLETON-VICTORIA REGION DISPOSAL SITES - SUMMARY TABLE

Disposal Site:	Bloomfield	Waterville	Cloverdale	Maplehurst	Summerfield
Authority:	DOT	DOT	DOT	DOT	DOT
Disposal Method:	Trench	Trench	Trench	Trench	Trench
Total/Excavated Area:	2 acres / <0.1 acres	3 acres / 0.3 acres	5 acres / 2 acres	8-10 acres / .3 acres	7 acres / < .1 acres
Percentage Filled:	40	10	10	60	10
Life Expectancy-Yrs:	10-15	10	25	5-10	25
Areas Served:	Bloomfield, Good Corner, Lindsay, Weston, Brookville, Brigg's Mill	Rosedale, Waterville, Somerville, Jacksontown, Victoria'Cor, Wakefield, Lindsay, some Hartland & Upp Woodstock & Woodstock	Howard Brk, Carlisle, Mainstream, Pole Hill, Cloverdale	Bath, Kilburn, Muniac, Holmesville, Johnville, Upper Kent	Blue Hill, Birdsville, Riv-de-Chute, Up Wicklow, Summerfld, Back Greenfld, some Up Knoxford
Population:	700	3000			800
Households:	300	600	170		170
Waste Volume/Year:	1500 tons	25000 tons	365 tons		287 tons
ICI Wastes:	Car bodies Other metals	Contaminated grains, etc			Motel & Restaurant
Hours of Operation:	24 hours	24 hours	24 hours	24 hours	24 hours
Staffed:	No	No	Fire Season Only	Fire Season Only	No
Cover Application:	Monthly in summer, with soil. Occasionally once a year with gravel	Use material at site, haul some in once a year	Cover with ditching material when available	Dozer cleans out trench Not much cover put over material	dozer for 6 hours, every 6 weeks during summer
Annual Cost:	$4,500	$10,000	$7,000	$9,500	$5,000
Waste Separation:	Car bodies and scrap metals	Metals Trees	No	Metals	No
Recycling:	Car crushing-every 3-4 years - to scrap dealer	No	No	No	No
Fencing:	Partial	Partial	No	No	Partial
Security Gate:	No	No	No	No	No
Road Signs:	Yes	Yes	Yes	Yes	Yes
Burning/Permitted:	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Pest Control:	Yes - PCO	Yes - PCO	Yes - PCO	Yes - PCO	Yes - PCO
Oper&Maint Problems:	No	Must be careful burning during dry season- close to woods	No	Public leaves material on parking level- won't put it in trench	No
Public Concerns:	Complaints of Smoke	No	Groundwater contamination	Adjacent property claims dump consists of part of his property	No

TABLE 3.3 (cont'd)
CARLETON-VICTORIA REGION DISPOSAL SITES - SUMMARY TABLE

Disposal Site:	Bonaccord	Licford	Tilley	New Denmark	Riley Brook
Authority:	DOT	DOT	DOT	DOT	DOT
Disposal Method:	Trench	Trench	Trench	Trench	Trench
Total/Excavated Area:	10.4 acres / 2 acres	9.4 acres / 2 acres	8 acres / 2 acres	5 acres / 4 acres	5 acres / 1 acres
Percentage Filled:	15	35	30	70	25
Life Expectancy-Yrs:	20	15	15	4	20
Areas Served:	Bonaccord, Kintore Muniac	Arthurette, Odell, and some rural Plaster Rock	North & South Tilley	New Denmark, some of Upper Drummond	Nictau, Riley Brook
Population:	350	800	600	850	240
Households:	75	200	150	220	70
Waste Volume/Year:	275 tons	661 tons	440 tons	717 tons	220 tons
ICI Wastes:	Scrap metals	Scrap metals and other	Scrap metals and other	Scrap metals and other	Scrap metals and other
Hours of Operation:	24 hours	24 hours	24 hours	24 hours	24 hours
Staffed:	Part-time 2 d/wk May-Nov	Part-time 4 d/wk May-Nov	Part-time 2 d/wk May-Nov	Part-time 4 d/wk May-Nov	Part-time 3 d/wk May-Nov
Cover Application:	trench cleaned twice/yr covered with borrow using large dozer	trench cleaned twice/yr pushed into old dump using dozer	trench cleaned twice/yr covered with borrow mat. using excavator	trench cleaned twice/yr covered with borrow mat. using excavator	trench cleaned twice/yr covered with borrow mat. using excavator
Annual Cost:	$8,000	$14,000	$8,500	$14,000	$7,000
Waste Separation:	Hardware	Hardware	Hardware	Hardware	Hardware
Recycling:	No	No	No	Car Bodies crushed (200) + hardware for scrap	Car Bodies crushed (100) + hardware for scrap
Fencing:	Partial	Partial	Partial	Partial	Partial
Security Gate:	No	No	No	No	No
Road Signs:	Yes	Yes	Yes	Yes	Yes
Burning/Permitted:	Yes/Yes with DNR permit	Yes/Yes with DNR permit	Yes/Yes with DNR permit	Yes/Yes with DNR permit	Yes/Yes with DNR permit
Pest Control:	No - no problems	Yes - PCO	Yes - PCO	Yes - PCO	Yes - PCO
Oper&Maint Problems:	some outside trench dumping and wild animals	some outside trench dumping and wild animals	some outside trench dumping and wild animals	some outside trench dumping and wild animals	some outside trench dumping and wild animals
Public Concerns:		fuel/contam soil dumping + oth dangerous material	used to have problems with dumping of agric. chemical containers		

TABLE 3.3 (cont'd)
CARLETON-VICTORIA REGION DISPOSAL SITES - SUMMARY TABLE

Disposal Site:	Two Brooks
Authority:	DOT
Disposal Method:	Trench
Total/Excavated Area:	5 acres / 1 acres
Percentage Filled:	35
Life Expectancy-Yrs:	15
Areas Served:	Upper Plaster Rock, Two Brooks
Population:	450
Households:	100
Waste Volume/Year:	386 tons
ICI Wastes:	Scrap metals and other
Hours of Operation:	24 hours
Staffed:	Part-time 3 d/wk May-Nov
Cover Application:	trench cleaned twice/yr covered with borrow mat. using excavator
Annual Cost:	$8,500
Waste Separation:	Hardware
Recycling:	No
Fencing:	Partial
Security Gate:	No
Road Signs:	Yes
Burning/Permitted:	Yes/Yes with DNR permit
Pest Control:	Yes - PCO
Oper&Maint Problems:	some outside trench dumping and wild animals
Public Concerns:	

3.5 Recycling Operations

Local Recyclers

Currently there are four recycling operations in the Carleton - Victoria Region: Carleton County Recycling and Woodstock Recycling, both located in Woodstock, as well as Victoria County Recycling which just began operations in Perth-Andover, and a recycling program in Bath.

Established in October 1990, Carleton County Recycling operates a blue box program serving approximately 1,200 homes in Woodstock and the immediate vicinity. They collect such recyclables as cardboard, newsprint and fine paper, glass bottles, plastic bags and containers, aluminum cans, and egg cartons.

The project was set up as a joint effort incorporating the services of Kearney's Hygenic and the Community Industries Employment Vocational Association (CIEVA). Kearney's handles the weekly collection of the blue boxes with one person operating a one ton truck with a dump box. Apart from the residential program, Carleton County Recycling also collects from some printing offices in the area, while several schools and other institutions collect and drop off paper and other recyclables to the sorting and baling facility located in the Woodstock Industrial Park. CIEVA supplies three or four persons, as required, to work at this facility, sorting and baling the recyclables. This is carried out using a vertical downstroke baler which bales newsprint and other paper, plastic and cans. Glass is crushed by hand and stored in large wooden boxes. Appendix D contains several photographs of the recycling facility.

Currently, the Carleton County Recycling blue box program has an 80 percent participation rate with residents contributing on a weekly, bi-weekly and monthly basis. This represents approximately 109 tonnes of newsprint and egg cartons, 8 tonnes of other paper, 45 tonnes of glass, 2.5 to 3 tonnes of plastic and 3 tonnes of aluminum cans yearly.

Woodstock Recycling began approximately 3 years ago, and operates the recycling facility used by Carleton County Recycling. This firm handles only corrugated cardboard. It uses all cardboard collected by Carleton County Recycling, as well as collects, through Kearney's, from many commercial and industrial firms in Woodstock and surrounding

area. It is estimated that since the operation has started, approximately 75 percent of the cardboard that used to go to the Woodstock Landfill, is now being recycled and sold to pulp mills at Saint John and Lake Utopia. This amounts to approximately 236 tonnes per year.

As part of their weekly residential waste collection service, the Village of Bath requires that all residents separate glass bottles and aluminum cans from the rest of their wastes. At the dump the site supervisor directs rural users to also separate their bottles and aluminum cans into the designated bins along the access road in to the dump site active face. Recyclable materials are stored at the site in bins for accumulation and marketing.

Victoria County Recycling has just recently been established (February, 1992) by Helpers of Planet Earth (HOPE) and presently serves about 700 households in the Perth-Andover area with plans to expand to surrounding localities over the next two to three years, serving an estimated population of 12,300 by 1994. As well, the operation serves most commercial and institutional firms and offices in the village collecting recyclables similar to those collected by Carleton County Recycling. Materials are collected from drop-off bins located at schools, offices and institutions on a weekly basis, with two persons operating a cube van. Currently there is no residential collection, instead drop-off bins are located at the facility and are available to the public 24 hours a day. In addition, cardboard and newsprint collected by Gee's Trucking, a local waste hauler, are transferred to the recycling operation.

The facility itself operates with three to four floor persons as needed to sort and bale the recyclables using a vertical down-stroke baler for cardboard, paper, plastics and cans. Glass is crushed by hand or marketed unbroken.

Although just beginning, the participation rate for this recycling program is expected to be 75 percent. Volumes per year are projected to be 36 tonnes of newsprint, 9 tonnes of other paper, 23 tonnes of glass, 1 tonne of aluminum, 3 tonnes of plastic and 104 tonnes of cardboard.

Altogether these four programs will divert approximately 265 tonnes of residential wastes (newspaper, glass, fine papers, plastic fibre and aluminum cans), and 340 tonnes of ICI cardboard wastes; a total of 605 tonnes from the waste stream.

Several waste haulers interviewed for this study indicated they were or would soon be involved to some degree in recycling. For instance, Mr. Gibb Trecartin, who operates the Hartland Municipal Dump and hauls waste in surrounding areas, saves scrap metal and aluminum cans which he stores at the dump. His residential customers separate these materials each week to facilitate their collection. These are sold periodically to a scrap dealer from Fredericton.

Other Regional Recyclers

In addition to the activities mentioned above, there are several other Maritime and Quebec based recyclers operating in the Carleton - Victoria Region.

Inland Oil of Truro, N.S. collects waste oil from local service stations, trucking and manufacturing firms, and food processors in the area.

Cyclamet of Scoudouc collects and bales scrap metal including derelict auto bodies at several local dumps within the Region. They provide this service free of charge for local municipalities and the Department of Transportation who operate most of the rural dumps. Another scrap metal dealer, C.F. Fletcher, operating out of Quebec, collects from local firms such as Thomas Equipment of Centreville and Covered Bridge Printing of Hartland.

Recycled Waste Volumes

Table 3.4 presents a summary of the volumes of the principal materials recycled by residents and the ICI sector. In total 2,720 tonnes of waste are recycled in the region. Of this 2,455 tonnes (90%) is recycled within the ICI sector.

This figure excludes woodchips and hog fuel generated by the Region's sawmills, as well as any potato wastes generated on farms. These wastes are not recycled, but diverted waste volumes. Section 4.2.1 Industrial Wastes, following, details these activities and their associated volumes.

TABLE 3.4

ESTIMATED RECYCLED WASTE VOLUMES (TONNES)

	Recycled Materials	Tonnes per Annum
Residential:	Newsprint	145 T
	Paper	17 T
	Aluminum Cans	5 T
	Glass Bottles	92 T
	Plastics	6 T
	Sub Total:	265 T
ICI:	Cardboard	760 T
	Newsprint/Papers	60 T
	Scrap Metals	1,350 T
	Oil	175 T
	Plastics	65 T
	Tires	5 T
	Batteries	40 T
	Sub Total:	2,455T
Total:	All Recycled Materials	2,720 T

3.6 Other Recycling and Waste Diversion Activities

Through interviewing various municipalities, waste haulers and ICI establishments throughout the Region, it is apparent that waste diversion through recycling, reuse, and reduction has become somewhat popular. Most people feel the need for a continued and expanding effort to reduce the overall volume of waste being landfilled. Following are several representative examples of how firms and institutions in the Region are reducing, reusing and recycling wastes:

- Day & Ross Ltd. reuses all freon gas used in refrigerated trailers.
- Carleton Memorial Hospital in Woodstock internally reuses plastic containers, glass bottles, linens, etc. and recovers silver nitrate from X-ray plates each year.
- Humpty Dumpty Foods Ltd. has potential for using its corn and potato wastes to produce alternative feed for livestock.
- Several service stations and vehicle maintenance shops in the area re-sell used batteries and tires as well as some scrap metal to local residents for home and farm use. Inland Oil collects their waste oil for recycling and reuse.
- Karnes Kitchen Ltd. has switched to bulk and liquid ingredients for its products, as well as the use of returnable tote bags.
- Many local schools have begun recycling campaigns collecting aluminum cans, bottles and paper.
- Many offices reduce paper waste by using double-sided copying.
- Many residents reuse glass and plastic containers, plastic bags, clothing, newspapers and cardboard cartons within the home.

4.0 WASTE GENERATION AND COMPOSITION

The purpose of determining waste generation levels is to provide existing and projected estimates of how much and of what types of wastes must be managed within the Carleton-Victoria Region. This information in turn is used to assess potential waste management technologies and management choices. An effort, therefore, has been made to estimate not only how much waste is presently produced in the Region, but also the approximate composition of the waste generated and an estimation of how much waste is recycled or otherwise diverted from the disposal sites. As such, the study provides a "snap-shot" view of waste generation and management in 1992.

Traditionally recycling has involved scrap metals, oil and various process materials within the industrial sector. In very recent years (ie. beginning about 1988 and 1989) considerable attention and growth in recycling and other waste diversion practices has evolved. Industry now post their product wastes in industry clearing houses for resale as inputs to other industries. For instance much of sawmill waste by-products are now chipped for pulp or consumed as hog fuel at heating plants. Residential and office recycling programs have been set up to divert particular consumer waste products such as newspaper, fine papers, cardboard, plastic bags, glass, plastic, steel and aluminum containers from disposal.

Markets have at times been soft or non-existent for some recycled materials and accordingly recycling programs vary, and in some cases their longevity remains unproven. Given this uncertainty, it has been necessary in this waste audit to attempt to identify quantities of waste materials presently disposed at dump sites, as well as those which are presently recycled or otherwise diverted from disposal. Therefore, future alternatives which may affect the present recycling programs (eg. the New Brunswick Beverage Containers Act) can be evaluated in the next Phase II - Evaluation of Alternatives Study.

4.1 Residential Waste Generation

After reviewing the estimates of residential solid wastes generated from waste audits in other regions of the Province, it was decided that the most reliable information is

available from the Fredericton and Nepisiguit-Chaleur solid waste management commissions. These regions have landfill site weigh scale information for recent years of operation with separate records of the origins of the waste (ie. rural and municipal residential wastes, and other ICI wastes). Waste generation rates have been calculated from these landfill sites by dividing the amounts of waste generated by the municipal and rural populations of the Regions, and the days of the year.

Table 4.1 summarizes the total residential wastes generated in the Fredericton and Nepisiguit-Chaleur regions for the year 1991 broken down by urban versus rural areas.

Since there are no cities in the Carleton-Victoria Region, the average waste generation rate of the towns and villages only in the Fredericton and Nepisiguit-Chaleur regions are the most appropriate to the Carleton-Victoria Region. Therefore, a waste generation rate of 0.94 kg per person per day has been applied to each municipality in the Region. Put in annual context this amounts to about 343 kg per person per year, or an annual total of 4,133 tonnes of waste generated by the 12,045 municipal residents of the Region.

The combined average annual rural area residential waste generation rate of the two Fredericton and Nepisiguit-Chaleur regional commissions of 0.92 kg per person per day has been applied to the rural population of the Carleton-Victoria Region. This is equivalent to about 336 kg per person per year or an annual total of 8,776 tonnes of residential wastes generated by the 26,135 residents in the rural LSD's of the Region. Table 4.2 presents the estimated 1992 residential waste volumes generated in the Region, on a zone by zone basis.

In total residential wastes generated in the Carleton-Victoria Region are estimated to amount to 12,909 tonnes per annum. Of this residential waste tonnage it is estimated that 265 tonnes per annum are diverted from disposal by the residential recycling operations in Woodstock, Bath and starting up in Perth-Andover, leaving 12,644 tonnes of residential wastes going into the local dumps.

TABLE 4.1

RESIDENTIAL WASTE GENERATION RATES AT FREDERICTON AND NEPISIGUIT-CHALEUR REGIONAL LANDFILL SITES - 1991

Residential Population Area Served	Residential Wastes Generated (kg per person per day)	Residential Wastes Generated (kg per person per year)
Total Fredericton Region	0.87	316
Total Nepisiguit-Chaleur Region	0.79	288
Average of Total Regions	0.84	307
Average of Towns and Villages Only	0.94	343
Average of Rural Areas Only	0.92	336

TABLE 4.2

ANNUAL RESIDENTIAL WASTE VOLUMES FOR THE CARLETON-VICTORIA REGION

Zone	Description	1992 Population	1992 Households	Annual * Waste Volumes (T)
1	New Denmark	1,816	580	610
2	Andover-Grand Falls	2,459	778	829
3	Plaster Rock	1,232	460	423
4	Lorne-Gordon	2,680	840	900
5	Perth	1,955	611	657
6	Perth-Andover	1,889	705	648
7	Kent-Aberdeen	5,148	1,645	1,740
8	Florenceville	725	255	249
9	Wicklow-Wilmot-Simonds	4,255	1,333	1,433
10	Brighton-Peel	3,197	977	1,074
11	Hartland	917	310	315
12	Wakefield	2,709	838	910
13	Woodstock	4,824	1,705	1,655
14	Richmond-Woodstock	3,062	1,085	1,028
15	Northampton	1,312	410	441
	Total	**38,180**	**12,533**	**12,909**

* - Waste volumes generated include recycled materials equalling 265 tonnes in the Region. A net amount of 12,644 tonnes is disposed at the dump sites in the Region.

4.2 ICI Waste Generation

To calculate the volumes of ICI waste in the Carleton/Victoria Region it was necessary to determine how many industrial and commercial firms, as well as institutions there are in the area. A database was created of individual establishments using listings from industrial/commercial and telephone directories and Statistics Canada. Provincial and federal information sources include NB Dept. of Agriculture and Agriculture Canada sources for farm information, NB Dept. of Natural Resources for sawmills, NB Dept. of Tourism Recreation & Heritage for accommodations, and NB Dept. of Education for schools. Establishments were first counted for each zone on an industry sector basis using a detailed classification system, which was then aggregated to fit the eleven sectors listed in **Table 4.3**. **Table 4.4** provides the classifications of firms used for each ICI sector.

The following sections describe the wastes generated by each of the Industrial, Commercial and Institutional sectors. **It is important to note that due to concerns of information confidentiality expressed by some of the industrial firms included in the ICI survey, estimated waste tonnages for the ICI sector will be provided only by the total of industry sector wastes generated in the Region.**

4.2.1 Industrial Waste

While the economy of the Carleton-Victoria Region is fairly diverse, its mainstay industrial activities are farming and agriculture-related food processing (agrifood), as well as forestry resources and sawmills. A substantial portion of the remaining industry in the Region (trucking firms, industrial equipment fabrication, and various manufacturing and supply based firms) have developed from the agriculture and forestry sectors. In total all industrial firms in the Region produce 12,238 tonnes of waste, which presently enter the solid waste stream for landfill at local public or private dump sites.

Both the agriculture and forestry industries are high volume producers of organic wastes. It is the nature of their industries. However, much of their waste by-products are retained on site and never enter the waste management system, as discussed in the ensuing subsections.

TABLE 4.3
CARLETON VICTORIA SOLID WASTE AUDIT
SUMMARY OF NON-RESIDENTIAL USES BY ZONE

ZONE	SECTOR *											
	Food & Accomodation	Retail Stores	Grocery Stores	Automotive Sales & Service	Other Commercial	Medical Services	Schools	Other Institutional	Agriculture/ Agrifood	Forest Products	Other Industrial	TOTAL
1-Denmark	4	0	2	9	7	0	2	3	58	0	3	88
2-Grand Falls	2	0	5	4	5	0	1	3	78	0	14	112
3-Plaster Rock (V)	8	8	6	15	25	8	2	21	0	3	9	105
4-Lorne/Gordon	40	0	8	3	3	0	2	1	26	4	13	100
5-Perth	3	1	1	2	1	0	0	7	26	3	3	47
6-Perth-Andover (V)	11	12	10	15	66	18	3	19	1	3	18	176
7-Kent/Aberdeen	11	3	12	19	21	7	4	14	108	8	21	228
8-Florenceville (V)	4	6	2	7	29	6	3	15	3	0	10	85
9-Wicklow/Wilmot	5	2	9	14	21	2	3	13	123	2	22	216
10-Peel/Brighton	2	0	2	4	4	0	0	1	83	2	9	107
11-Hartland (T)	3	4	2	10	25	0	1	0	2	0	19	66
12-Wakefield	1	2	3	9	13	1	1	1	88	0	21	140
13-Woodstock (T)	15	20	9	21	124	10	8	2	4	1	41	255
14-Woodstock/Richmon	6	1	3	10	15	0	1	0	68	5	10	119
15-Northampton	0	0	1	2	4	0	0	0	23	1	2	33
TOTAL	**115**	**59**	**75**	**144**	**363**	**52**	**29**	**90**	**691**	**32**	**215**	**1865**

* - Subsector catagories of firms comprising each ICI sector are provided in Table 4.4.

TABLE 4.4

LIST OF FIRM CATEGORIES BY SECTOR

Commercial:

1. Food & Accommodations: (115)

   - Fast Food Restaurants
   - Diner/Traditional Restaurants
   - Hotels with Restaurants
   - Motels with Restaurant
   - Campground/Picnic Parks
   - Fishing/Hunting Lodges/Camps
   - Gas Bars with Restaurants

2. Retail Stores (59)

   - Department Stores
   - Hardware & Bldg. Supplies
   - Clothing Stores
   - Boutiques

3. Grocery Stores (75)

   - Grocery Stores
   - Convenience Stores
   - Gas Bars/with Conv. Store

4. Automotive Supply/Service Stations (144)

   - Auto Dealers - New & Used
   - Truck Dealers - New & Used
   - Autobody Shops
   - Service Stations
   - Automotive Supply Stores
   - Farm Machinery - New & Used
   - Other Automotive

5. Other Commercial: (363)

   - Banks/Financial Institution
   - Printers
   - Consultant/Professional Services
   - Other Business (Service Sector - Barbers, Travel Agencies, Real Estate)
   - Other (Small) Retail - (Gift Shops, Florists Specialty Shops)

TABLE 4.4 (Cont'd)

Institutional:

6. Medical Services (52)

   - Hospitals
   - Medical Clinics
   - Nursing Homes
   - Doctor/Dentist Offices
   - Other Medical (Ambulance, Funeral Homes, Veterinarians)

7. Schools (22)

   - Elementary, Secondary, & High Schools
   - Kindergartens/Day Cares
   - Colleges

8. Other Institutional (90)

   - Government Offices
   - Police/fire/Public Works
   - Churches
   - Associations
   - Areas
   - Swimming Pools
   - Recreation Centres/Church Halls

Industrial:

9. Agriculture/Agri-food (691)

   - Farms:

     - Potato
     - Grains
     - Other Crops
     - Pork
     - Poultry
     - Beef
     - Dairy

   - Food Processing

TABLE 4.4 Cont'd

10. Forestry Products (30)

- Tree Nurseries
- Logging Companies
- Log Manufacturers
- Saw Mills
- Lumber Supply - Wholesale/Retail
- Christmas Trees

11. Other Industrial (184)

- Industrial Supply
- General Contractors (Plumbing, Electrical, etc.)
- Large Contractors (Road Builders, Large Construction Firm)
- Railroads/Public Utilities
- Industrial Processing
- Trucking/Transport (incl. Potato Shippers)
- Machine/Welding Shops
- Fuel Oils

Agriculture (Potato Waste)

More farms in the Carleton-Victoria Region grow potatoes than any other crop. Figures from Statistics Canada for 1986 indicate there were a total of 457 farms in the Region, of which 284 reported growing potatoes. On these farms, the total seeded land area amounted to 12,663 hectares. Agriculture Canada sources quoted an average yield of 22,500 lbs./acre or 25.5 tonnes/hectare per year across all varieties and growing conditions. When multiplied by the total seeded area, this amounts to an average annual production of 319,290 tonnes.

Due to seasonal variations in growing conditions, storage conditions, and seed variety, it is difficult to calculate an average percentage of yield which would be waste. Several Agriculture Canada and NB Dept of Agriculture sources, as well as a number of potato farmers have estimated a range of potato waste generation from less than 1% up to 5% of annual yield. For the purposes of this study, it was felt that 3% of crop yield per annum would best reflect an approximate average. This amounts to an annual average of 9,600 tonnes of potato wastes produced in the entire Region.

Table 4.5 lists the number of farms reporting potatoes, their yields, and annual waste on a zonal basis. Most potato waste from farms is returned to the soil or disposed of on site and do not as such enter the waste stream. For this reason this large amount of waste has not been included in the ICI waste generation figures for the Region. However, this estimate of potential disposable potato waste has been accounted for and will be addressed when examining waste management alternatives for the Region, as appropriate.

Estimates of waste tonnages for potato farms, other than potato waste, were based on ICI surveys of potato growers in the Region, as well as on rates generated from similar surveys in other Regions of the province. Similarly, waste generation rates from other surveys were used to calculate the annual waste tonnages for all other types of farms. Typical farm wastes are composed of paper, plastic bags, and cardboard, glass, metal and plastic containers, wood and metal scraps, various organic and food wastes and miscellaneous residual fertilizers, chemicals and petroleum waste products.

TABLE 4.5
CARLETON-VICTORIA REGION
ESTIMATE OF POTATO WASTE GENERATION

Zone	# of Farms Reporting Potatoes	Total Seeded Area (hectares)	Annual Yield (tonnes)	Annual Waste (tonnes)
1-Denmark	33	1,057	26,640	800
2-Grand Falls	45	2,163	54,530	1,640
3-Plaster Rock (V)	0	0	0	0
4-Lorne/Gordon	11	673	16,970	510
5-Perth	7	193	4,880	150
6-Perth-Andover (V)	0	0	0	0
7-Kent/Aberdeen	56	1,965	49,550	1,490
8-Florenceville (V)	0	0	0	0
9-Wicklow/Wilmot	59	3,093	77,980	2,340
10-Peel/Brighton	23	792	19,970	600
11-Hartland (T)	0	0	0	0
12-Wakefield	39	2,236	56,380	1,690
13-Woodstock (T)	0	0	0	0
14-Woodstock/Richmond	9	402	10,130	300
15-Northampton	2	89	2,260	70
Total	**284**	**12,663**	**319,290**	**9,590**

Forestry (Wood Waste)

In the Carleton/Victoria Region there are 29 firms operating in forestry-related activities. These can be broken into three groups: sawmills (3 large, 9 smaller), manufacturing (6), and sales and service (11). Of all waste produced in this sector, the vast majority is wood waste, primarily from the sawmills. The twelve sawmills in the Carleton/Victoria Region produce an estimated average annual volume of 263,000 tonnes of wood wastes - wood chips, shavings sawdust and bark. Wood wastes are typically not disposed of at a dump site. Instead most wood wastes are now reused. The remainder, approximately 31,000 tonnes, is normally stockpiled on site. This remaining wood waste consists of residues and dirt which passes through the screens and has no value as wood chips or hog fuel.

Most wood wastes can be marketed for use in pulp (wood chips), hog fuel (sawdust, shavings, bark, chips) or packaged for such commercial uses as animal bedding, landscaping, etc. An estimated total of 232,000 tonnes of sawmill wood waste are now reused in the Region.

One firm in the Region with a commercial application for wood chips is Brunswick Animal Bedding located adjacent to the Fraser Inc. sawmill at Plaster Rock. This firm markets wood chips, which are compressed, packaged and sold throughout the U.S.

Waste from the forest product industries, which normally enter the public solid waste stream, include cardboard and paper, metal and plastic containers, food wastes and some oil and tires. There is some recycling and reuse of scrap metals and oil.

Other Industrial Wastes

These industries are largely those which support and supplement the agricultural/agrifood and forestry-related sectors such as equipment fabrication, trucking/transport, as well as agriculture and forestry sector industrial suppliers. It also includes other light manufacturing industries, and public utilities. In total there are 215 other industrial establishments throughout the Carleton/Victoria Region.

Eight other industrial firms were interviewed in the ICI survey. From the responses, it was possible to generate average waste generation rates which were then applied to all

firms in the area. An average annual waste volume per employee was calculated using the survey information. This number was then applied to the total numbers of industrial employees for each zone, which were taken from Statistics Canada data, to arrive at an overall industrial waste production rate per employee estimate for other industries in the Region.

These industrial firms generally generate large amounts of paper and cardboard as well as, plastic packaging and containers, metal containers, scrap steel and other metals, sheet and bottle glass, wood crates and pallet scraps, tires and lunch room food wastes.

Most of the firms contacted through the ICI survey do recycle or reuse a portion of their waste. Scrap metal and old batteries commonly are sold locally or to scrap dealers who collect in the area. Cardboard from most firms in the Woodstock area is collected by Woodstock Recycling. Firms which have machine shops or truck servicing facilities often recycle or reuse scrap metals, used oil, scrap wood and batteries. Broken pallets and other scrap wood, as well as used oil solvents, are sometimes burnt as fuel by the firms themselves or by local residents. Inland oil of Nova Scotia also picks up used oil from some firms, at a cost of $.50/gallon.

4.2.2 Commercial Waste

Commercial waste includes all waste generated in the retail and service sectors, excluding any institutional establishments. In total, the Carleton-Victoria region generates 3,930 tonnes of commercial waste each year, almost all of which is landfilled at public dump sites. The exception would be a small number of firms in the Hartland area who contract waste disposal at the W.F. Rideout private dump. In all, Rideout's have approximately 15 non-residential customers at present, whose waste is disposed at a private site.

The following sections detail the commercial sector waste volumes and composition by commercial activity.

Food & Accommodations

Food and accommodations commercial firms include motels, restaurants, campgrounds/picnic areas, as well as outfitting lodges. Together these account for an

estimated annual waste volume of 483 tonnes, composed of paper, cardboard, plastics, metals (mainly of aluminum and steel cans), food waste, glass bottles, and other miscellaneous wastes (cooking grease, etc.).

Most of the motels and restaurants are located within municipalities and along the Trans-Canada Highway, as are most campgrounds and picnic areas. These were counted using the most recent accommodations guide published by the NB Dept of Tourism, Recreation & Heritage, which lists each by number of units or sites. Average generation rates were then applied on a per unit and per site basis to calculate the waste generation.

Outfitting lodges abound in the Region, numbering approximately 45 in total, 38 of which are located in the Plaster Rock area. A description of an average camp was obtained from the NB Outfitters Association, with respect to size/occupancy, length of season, and in particular, the waste generated. The average camp is open five weeks per year, and has from five to eight guests (non-residents), at any one time. The waste generated is similar in volume to that of a large household, and in composition to the motel/restaurant category. In total, this amounted to 14.5 tonnes per year of waste throughout the Region.

Retail Stores

Firms in this category include the larger retail stores - primarily clothing, hardware, and department stores. Other, smaller retail outlets such as electronics shops, sports shops, etc., due to the difference in waste volumes, are included in the Other Commercial sector.

There are 59 larger retail stores in the Carleton-Victoria Region, located mainly in the larger municipalities of Woodstock, Perth-Andover, and Plaster Rock. Together they produce an annual waste volume of 638 tonnes which is dumped at public landfill sites. Most of retail store wastes are paper products, particularly cardboard and boxboard, as well as various plastic packaging materials. Other wastes include lunch room food wastes and floor sweepings, etc. A considerable portion of the cardboard generated by the major retail stores in the Woodstock area is collected by Woodstock Recycling, and in Perth-Andover by Gee's Trucking for Victoria County Recycling.

Grocery Stores

There are 75 grocery stores throughout the Region, which are comprised of supermarkets, convenience stores and gas bars with convenience stores. Together these stores generate an estimated 1,187 tonnes of waste per annum. The primary wastes generated by grocery stores are cardboard, food waste and other plastic packaging. Some glass, metal and plastic containers, damaged, or with expired or perished food contents, are also commonly disposed from grocery stores. Most of the supermarkets in Woodstock and Perth-Andover participate in recycling cardboard cartons, which are generated in large volumes. Reuse of cardboard cartons is also extensively practiced by grocery stores for customers' groceries or other residential uses.

Automotive Sales & Service

Automotive sales and service establishments include automobile & truck dealers, autobody shops, service stations, farm machinery dealers, automotive supply stores and other automotive-related activities (towing firms, etc.).

In total there are 144 such establishments in the Region. They generate a estimated total of 689 tonnes of waste each year, which ends up dumped at public landfill sites throughout the Region. A considerable portion of waste generated by the auto service based firms are oil and scrap metal, much of which is recycled or reused. Other common wastes are various plastic, glass, and metal containers from solvents, paints and other materials. Papers and cardboard make up most of the rest of their wastes.

Other Commercial

Other commercial firms include the majority of retail businesses in the Region, which are smaller in size and waste generation levels than those described in the Retail Stores category. Also included within this category are the service-oriented businesses, consultants, financial institutions, etc. which all have similar waste generation characteristics.

In all, there are 363 such establishments in the Region with a total waste generation of 909 tonnes, which is dumped at public sites. The majority of waste produced by the

small retail stores is made up of box board and cardboard and various papers. Private services businesses wastes generated are mostly office papers, with miscellaneous other paper products, plastic packaging and containers, and lunchroom wastes.

4.2.3 Institutional Wastes

As with the Commercial sector, most of the institutional waste is produced in and around the various municipalities in the Carleton-Victoria Region. Woodstock and Perth-Andover are the largest such communities with the majority of the Region's institutional infrastructure - schools, hospitals and government offices.

Medical Institutions

While **Table 4.3** listed a total of 52 medical establishments within the Carleton-Victoria Region, it should be pointed out that this number includes doctors/dentists offices, for example, of which two or more may be found at one location. Also included are the Regions hospitals and medical clinics, as well as nursing and special care homes and funeral homes.

The ICI survey included interviews with representatives of several medical facilities, including Carleton Memorial Hospital in Woodstock, the Bath Medical Clinic, as well as nursing homes in Woodstock and Perth-Andover.

In total, medical institutions generate an estimated total waste volume of 695 tonnes. Approximately 18% of this total is incinerated on a regular basis. The remaining 570 tonnes is disposed at public landfill sites throughout the Region.

Medical institution wastes are primarily composed of paper and cardboard, food waste, other biomedical wastes, along with smaller amounts of glass, metal and plastic containers and packaging. Biomedical wastes include various non-recyclable paper products such as pediatric and adult diapers, dressings, bandages, body fluids and parts, as well as 'sharps' (syringes, razors, etc.). Much of these biomedical wastes are incinerated.

The incinerator at the Carleton-Memorial Hospital disposes approximately 72% of its waste stream, incinerating most of the biomedical wastes as well as other paper and cardboard. The other medical institutions in the Region dump the majority of their wastes. The main exception is the 'sharps' which are stored in disposal containers and incinerated.

An additional amount of about 3 tonnes per year of waste is recycled. Recycled materials include blue box materials from cafeterias, etc., as well as x-ray films from which silver can be extracted and re-processed.

Educational Institutions

The number of students enrolled at each school were acquired from representatives of the NB Community College in Woodstock and the School Districts in the Region. This information was used together with waste generation rates established from other waste audits in NB for each level of school: elementary, junior, and high, based on the number of students and applied to the 27 schools in the Region. In addition the waste volumes for the Community College in Woodstock were acquired in the survey.

In total, these schools produce an estimated 356 tonnes of waste each year. The wastes from schools are primarily paper and cardboard, (mostly paper towel, standard bond and newspaper and some cardboard) with the remaining made up of lunch food wastes, aluminum pop cans, glass bottles, some plastic packaging, and wood scraps.

Recycling efforts are under way at several schools in the Region. Those in the Woodstock area collect glass bottles, cans, and paper, which they deliver weekly to Carleton County Recycling. The schools in the Perth-Andover area are also planning to participate in the Victoria County Recycling program. About half of the schools recycle to some extent collecting mostly aluminum cans at present.

Other Institutional

This category includes mainly government offices, public works offices and facilities, emergency services, churches, associations, etc. The waste volumes were calculated, in part, by determining from Statistics Canada publications, the number of employees

working in this sector and applying an institutional waste generation rate on an employee basis. In addition, during the course of interviewing municipal representatives, estimates of waste volumes for the municipal services were attained.

In total, it is estimated that 416 tonnes of waste are generated by these other institutions each year, of which 119 tonnes (29%) are generated by the municipalities.

4.2.4 ICI Waste Volumes

Table 4.6 presents a summary of the ICI sectors waste volumes in tonnes generated throughout the Carleton-Victoria Region and disposed of at the public or private dump sites. Percentages of the total ICI waste volumes are provided for each of the three sectors, as well as the subsectors of the commercial and institutional sectors. The industrial sector waste volumes have not been provided in Table 4.6 due to guarantees to the industry of confidentiality.

Table 4.7 presents the volumes of ICI wastes not entering the waste disposal sites in the Region. These include woodchips and hog fuel and recycled ICI wastes, as well as potato wastes retained on farms, and sawmill wastes retained on site.

4.3 Waste Composition

Having established the overall residential and ICI sector waste volumes generated in the Region, it is also important to have an understanding of the composition of that waste stream. Waste composition data provides the information necessary to evaluate different waste management alternatives, such as waste reduction, reuse, recycling and composting programs, among other conventional waste landfilling and incineration options. Residential waste composition has been adopted for this study from a detailed statistical survey of residential waste conducted in Guelph, Ontario, in 1990 by R. Cave and Associates. On the other hand, the composition of the ICI waste stream has been principally estimated from the survey of ICI firms of the Region, and supplemented by surveys conducted in other regions of New Brunswick.

Table 4.8 presents a breakdown of residential and ICI wastes into eight generalized material categories - paper/newspaper, cardboard, plastic, metals, organic/food wastes,

TABLE 4.6

ICI WASTES GENERATED - DISPOSED VOLUMES[1]

Sector	Subsectors	Subsector Tonnes (T)	Subsector %	Sector Tonnes (T)	Sector %
Industrial	**Total:**	--	--	**12,238 T**	70%
Commercial	Food & Accommodations	483 T	12%		
	Retail Stores	638 T	17%		
	Grocery Stores	1,187 T	30%		
	Automotive	689 T	18%		
	Other Commercial	909 T	23%		
	Total:			**3,906 T**	22%
Institutional	Medical Services	695 T	47%		
	Schools	356 T	24%		
	Other Institutional	416 T	29%		
	Total:			**1467 T**	8%
Total Disposed ICI Wastes:				**17,611 T**	100%

[1] Waste volumes estimates provided in this table include only those ICI wastes which are disposed in public or private dump sites located in the Region. Estimates of other ICI wastes generated in the Region which are recycled, reused, or otherwise disposed or retained on site are indicated in **Table 4.7**.

TABLE 4.7

OTHER ICI WASTES - VOLUMES NOT DISPOSED[1]

		Tonnes (T)
1.	**Recycled/Reused ICI Wastes**:	
	- Wood Chips and Fuel	232,000 T
	- Recycled ICI Waste	2,455 T
2.	**ICI Wastes Stored on Site**	
	- Wood Waste (sawmills)	31,000 T
	- Potato Waste (farms)	9,600 T

[1] Note: None of the above noted ICI wastes presently are disposed of in public or private dump sites in the Region.

TABLE 4.8
CARLETON-VICTORIA REGION
RESIDENTIAL AND ICI WASTE STREAM COMPOSITION

	WASTE TYPE(1)							
SECTOR	Paper	Cardboard	Plastics	Metals	Organic/ Food Waste	Glass	Wood	Other
RESIDENTIAL(2)	28%	8%	5%	5%	32%	7%	1%	14%
ICI	14%	17%	3%	22%	27%	5%	6%	7%
Industrial	11%	16%	2%	27%	25%	6%	7%	6%
Commercial	14%	30%	9%	1%	43%	2%	-	-
Institutional	42%	4%	0%	1%	19%	1%	-	33%
TOTAL	**19%**	**14%**	**3%**	**16%**	**29%**	**6%**	**4%**	**10%**

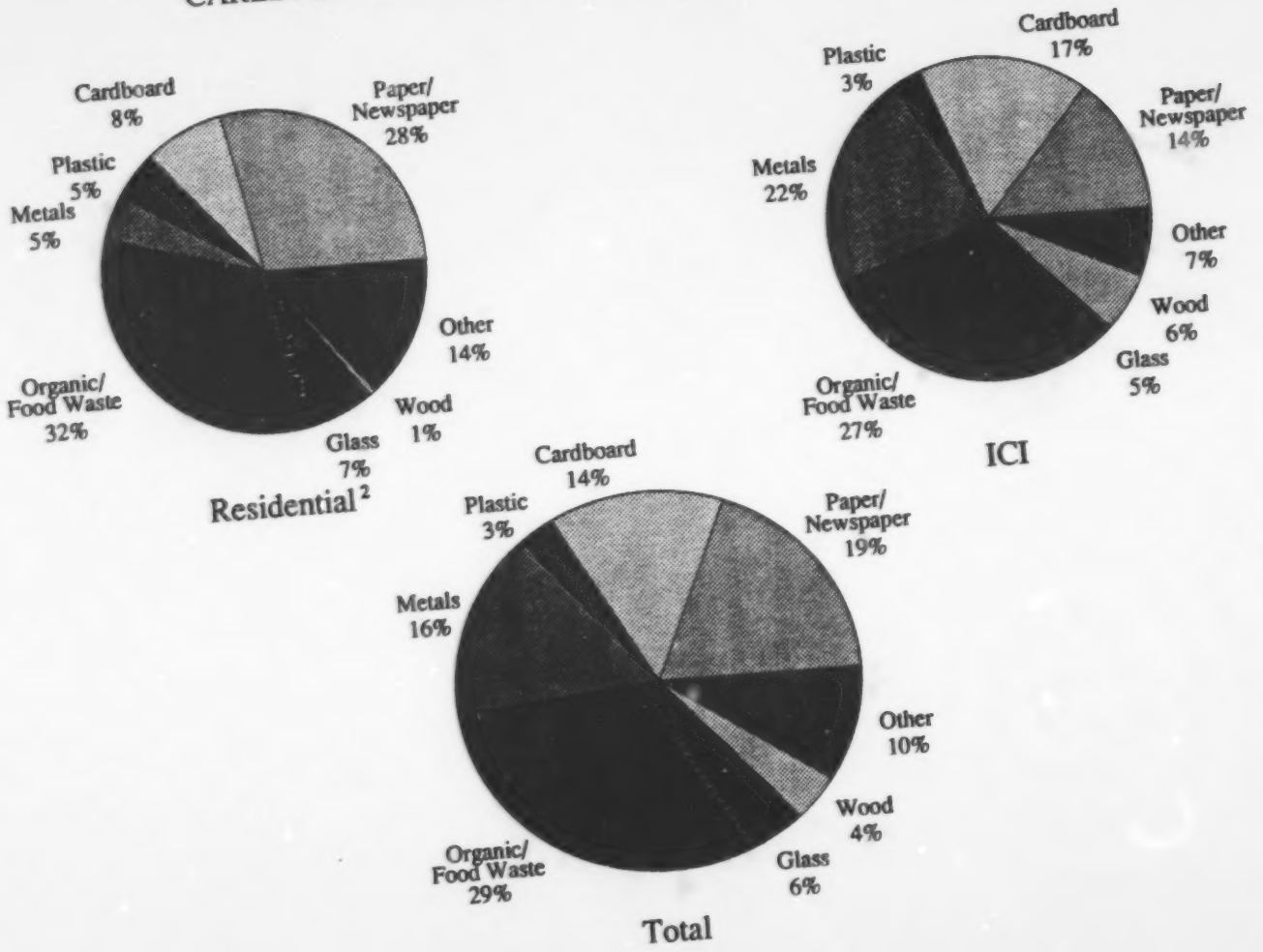
(1) Waste types listed in this table are comprised of the following:
- Paper: newspaper; glossy, fine and mixed papers;
- Cardboard: OCC cardboard, boxboard, multi-layer packages;
- Plastics: plastic film, containers, foam, PET, other plastic;
- Metals: ferrous and non-ferrous metals such as aluminum cans, tin, brass, iron, (scrap metal);
- Organic/Food Waste: all food wastes, yard wastes, and other organic excluding biomedical;
- Glass: clear and coloured glass, non-container glass, ceramic and other glass;
- Wood: broken pallets and other wood scraps;
- Other: Textiles, rubber (including tires), leather, sanitary products, diapers, biomedical wastes, batteries, oil/grease, gyproc and other misc. building materials, etc.

(2) The residential sector waste composition information has been adapted from R. Cave Associates, 1990 figures. Material catagories have been combined to reflect the waste types developed from the ICI survey, as indicated above.

glass, wood and other wastes. Figure 4.1 illustrates the residential, ICI and total waste stream composition.

The proportions of products included in each of the eight waste material categories differ within the residential versus the ICI waste stream. Fore instance the paper/newspaper wastes are principally newspaper in the residential waste stream, but are mostly office papers in the ICI waste stream. Residents generate mostly plastic bags and containers, while proportionally more of plastic in the ICI sector is packaging material and industrial molded plastics. Metals generated by residents are largely steel and aluminum containers, whereas ICI firms generate mostly scrap steel and other industrial scrap metals. Residents generate proportionally more food waste versus organic wastes than the ICI sectors.

FIGURE 4.1
ESTIMATED COMPOSITION[1] OF
CARLETON-VICTORIA REGION SOLID WASTE STREAM



1. See Table 4.8 for waste materials included in waste composition catagories.
2. The residential sector waste composition information has been adapted from R. Cave Associates,
Material catagories have been combined to reflect the waste types developed from the

5.0 WASTE COLLECTION AND DISPOSAL COSTS

5.1 Residential Waste Collection Costs

As was pointed out in Chapter 3.0, there are three general methods of waste collection in the Carleton - Victoria Region. They are:

1. Municipally Contracted Waste Collection: This roadside waste collection service is available to all residents within the municipality on a weekly basis. Four municipalities - Florenceville, Bristol, Bath and Plaster Rock - provide contracted waste collection to their residents. Each municipality pays the private waste hauler a budget amount per year or has staff collect wastes; so residents pay for waste collection through their property taxes. Plaster Rock and Bristol also provide waste collection for small commercial businesses and institutions of their Villages. Municipally contracted waste collection services are provided to approximately 10 percent of all residential households of the Carleton - Victoria Region.

2. Individual Contract with Private Waste Hauler: This roadside waste collection service is contracted service between each individual household and a local private waste hauler. Services are provided on a once per week basis to any residents under a service contract. Waste collection services are charged on a weekly or monthly basis per household and range from $1.50 to $4.00 per week. Normally these waste collection services are the same as would be provided with a municipally contracted service. Approximately 12 percent of all residential households in the Carleton - Victoria Region receive individually contracted waste collection service.

3. Resident Self-Delivery of Wastes: Many residents either have no waste collection service available to them, or choose not to purchase private contracted waste haulage services. They deliver their wastes on their own to the local dump. Province-wide, the estimation of residential self-delivery has been $2.00 per week per household. This is based on an average vehicle operating cost of $0.25 per kilometre for fuel and vehicle maintenance and depreciation times an average

round trip of 8 kilometres to a local dump site. For some households within close proximity to a dump site, this average cost would be high, but for others located more distant from a dump site this average cost would be low. Approximately 78 percent of all residential households in the Carleton - Victoria Region provide their own waste delivery.

Table 5.1 presents a summary of the residential waste collection costs for each method summed for all of the Carleton - Victoria Region. The total cost of waste collection and delivery to the local dump sites in the Region is estimated to be $1,201,800, at an average cost of $95.89 per household per year.

TABLE 5.1

CARLETON-VICTORIA REGION RESIDENTIAL
WASTE COLLECTION COSTS (1992)

Collection Service	Cost
Municipal Contract (1,235 Households)	$51,420
Individual Contract (1,533 Households)	$134,820
Residential Self-Delivery (9,765 Households)	$1,015,560
TOTAL	$1,201,800

5.2 ICI Waste Collection

Local industries, businesses and institutions either deliver their own wastes to a local dump site or contract a local waste hauler to provide waste delivery services for them. With the exception of Plaster Rock and Bristol, which collect wastes from small commercial and retail firms and institutions along with their municipal residential waste collection contracts, responsibility for ICI wastes collection is the responsibility of the private sector firms. This approach is unlikely to change. There is no overall organization or controlling agency for ICI waste collection. Each individual industrial or commercial firm chooses its own means of waste collection and transportation tailored to their particular type and volume of wastes generated.

ICI firms may opt to deliver their own wastes for a number of reasons, such as low or irregular waste generation levels, or possibly due to very high waste generation levels which necessitate removal of wastes as part of the industrial process. For whatever reasons, self-delivery of wastes by ICI firms involves use of their own staff and vehicles. Typically small delivery trucks and vans, used otherwise by the firm or institution, are used to deliver bagged, loose or small containers of wastes for disposal. Some larger firms may have specialized waste containers or other waste collection equipment.

Contracted waste haulage services are either on a regularly scheduled (eg. daily, weekly, etc.) or as required (eg. when waste container is full) basis. There are several types of ICI contracted waste collection services available; the most common of which are:

1. Half or Three-Quarter Ton Trucks or Vans: Use of these vehicles is normally to serve firms or institutions which generate low waste volumes in bags, or may be offered as part of a cleaning service.

2. Open One or Three-Ton Dump Trucks: Usually these vehicles are used to serve fairly low volume waste generating firms or institutions with wastes in bags or bulky non-compatible items. Contractors will often have a collection route of business clients organized to ensure full loads when hauling to the disposal site. Trucks normally have built-up side-boards for higher capacity loads.

3. Dumpster Containers/Front-Load Packers: This ICI waste collection system involves installation of small dumpster containers on-site, at the firms location. The containers from several sites along the private hauler's collection route are dumped into a large front-load packer, compacted and delivered to the disposal site when the packer is filled. This fairly versatile system is appropriate to a wide range of waste generation levels.

4. Compaction Containers/Tilt-Frame Trucks: This ICI waste collection system involves installation of larger roll-on/roll-off containers for delivery to the disposal site. A single truck may serve several firms, one at a time. This system is suited to high volume waste generators.

Most ICI waste haulers in the Carleton - Victoria Region have the smaller sized trucks and provide both residential and ICI collection. ICI waste collection costs vary widely, depending on the waste volume and frequency of pick-up. Some of the firms quoted costs of up to $100 per trip to a dump site. Many firms which haul their own waste had no idea how much it cost them, others were hesitant to disclose their costs.

Due to the wide range of ICI waste collection approaches and the very limited cost data available, it is not practical to attempt to estimate the overall Region's ICI waste collection costs. Nor is it necessary, given that responsibility for waste collection among ICI establishments will remain in their own hands even after a regionalized waste management system is in operation, and would not be charged through the tax system.

5.3 Dump Site Costs

The nine municipalities each pay for the costs of operating their own dump site through their municipal service budgets. Residents do not pay a direct tipping fee (ie. a user fee based on the per tonne weight of wastes dumped), but instead pay indirectly through their municipal property taxes.

Rural areas dispose of their wastes at the NBDOT operated rural dump sites. These costs are paid through the NBDOT operating budget paid out of the Provincial general treasury funds. In addition, rural communities and LSD's in the immediate vicinity of a municipal dump have been granted the right to use the municipal dump. The NBDOT compensates the municipalities for allowing the rural residents use of their sites. They have estimated the number of rural residents using each municipal dump site, as follows:

- Woodstock - 3,900
- Bath - 1,000
- Bristol - 600
- Centreville - 1,000
- Florenceville - 1,200
- Plaster Rock - 1,600
- Perth-Andover - 2,063
- Aroostook - 600

Each municipality is paid by the Province $8.28 per capita, as estimated, of rural resident dump site users.

Table 5.2 presents the annual operating costs of each public dump site in the Carleton - Victoria Region. The municipal annual operating budgets reflect the actual costs of the dump site operations. The bracketed numbers which add up to $98,762 are the actual transfers of revenue from the Province to the municipalities for rural users. They do not represent an addition or a reduction in the dump site operating costs, but do provide a reduction in the net cost to the municipalities of their dump site operations.

When the annual operating budget costs of the nine municipally owned dump sites are summed, the total cost of the municipal dump site operations for 1992 is $217,870. These are the true costs of operating the municipal dump sites in the Region. However, when the transfer to the municipalities are included, the net costs to the municipalities are reduced to $119,108.

The total cost of operating the 17 NBDOT dumps is $137,000. So when added to the municipal dump site operating costs, the total cost of all public dump site operations in the Carleton - Victoria Region is $354,870 for 1992.

5.4 Residential Waste Collection and Disposal Costs

In order to estimate the present costs to residents for solid waste collection and disposal, the percentage of the costs of ICI wastes disposed at the dump sites must first be removed. The remaining 12,644 tonnes of residential wastes disposal costs have been estimated to be $194,700.

Table 5.3 provides a summary of the cost of residential collection and disposal costs for the Carleton - Victoria Region in 1992. These costs exclude the costs of ICI waste collection and disposal. Total costs of residential waste collection and disposal in the Region have been estimated at just less than $1.4 million, or $111.67 per household per year.

TABLE 5.2
CARLETON-VICTORIA REGION
PUBLIC DUMP SITE COSTS

Site	Operator	Annual Operating Budget	Rec'd from NBDOT for Rural Use	Net Cost to Municipalities
Woodstock	Municipality	$75,000	($32,000)	$43,000
Hartland	"	$12,000	$0	$12,000
Florenceville	"	$23,600	($9,936)	$13,664
Centreville	"	$10,000	($8,280)	$1,720
Bristol (1)	"	$5,200	($4,968)	$232
Bath	"	$23,980	($8,280)	$15,700
Perth-Andover	"	$40,740	($17,082)	$23,658
Aroostook	"	$8,000	($4,968)	$3,032
Plaster Rock	"	$19,350	($13,248)	$6,102
Subtotal		$217,870	($98,762)	$119,108
Coldstream	NBDOT	$7,000	-	-
Benton	"	$7,000	-	-
Glassville	"	$7,000	-	-
Juniper	"	$7,000	-	-
Debec	"	$7,000	-	-
Lakeville	"	$6,000	-	-
Bloomfield	"	$4,500	-	-
Waterville	"	$10,000	-	-
Cloverdale	"	$7,000	-	-
Maplehurst	"	$9,500	-	-
Summerfield	"	$5,000	-	-
Bonaccord	"	$8,000	-	-
Lieford	"	$14,000	-	-
Tilley	"	$8,500	-	-
New Denmark	"	$14,000	-	-
Riley Brook	"	$7,000	-	-
Two Brooks	"	$8,500	-	-
Subtotal		$137,000		
TOTAL		**$354,870**		

(1) Note: Annual operating costs of Bristol dump site exclude the cost of part-time supervision by a municipal staff person.

TABLE 5.3

SUMMARY OF RESIDENTIAL COLLECTION AND DISPOSAL COSTS

Residential Cost For	Annual Cost ($)	$/Household	$/Person	$/Tonne
Waste Collection	$1,201,800	$95.89	$31.48	$95.05
Waste Disposal*	$197,700	$15.78	$5.18	$15.64
TOTAL	**$1,399,500**	**$111.67**	**$36.66**	**$110.69**

* Residential disposal costs have been prorated to remove ICI waste disposal costs from the total, cost of dumpsite operations of $354,870.

6.0 FUTURE WASTE GENERATION

There are many factors which could influence future waste volumes generated in the Carleton - Victoria Region. However, as a guideline to evaluating potential waste management alternatives suitable to the Region in the future, it is safe to assume that the long term future waste generation levels will depend principally upon the overall growth of population. Population growth in turn is normally dependent upon economic growth through business and industrial development. Waste generation levels can also be affected by the particular types of industrial developments, and their respective net waste volumes generated. Consequently, the following sections present estimates of future population growth trends and corresponding growth in waste generation levels, as well as general review of industrial growth prospects and the potential impact on the waste generation trend.

6.1 Population Projections

Trend growth population projections have been estimated from 1986 to the year 2016. The forecast approach taken has been to utilize historic population levels of the 5 year census from 1971, 1976, 1981 and 1986 and to project future 5 year growth levels to the year 2016, using a linear regression forecasting technique. Each waste generation zone is comprised of a number of Statistics Canada Census Sub-Divisions (CSD's), ie. municipalities, parishes and reservations. The population of each CSD was forecast independently and then added together to produce a total projected population for each zone. The Region's total was calculated by summing the zone totals. The population projections of zones which have had declining populations over the past 20 years have been assumed to remain at their 1986 level thereafter.

Table 6.1 presents the population projections of the Carleton - Victoria Region to the year 2016. Projected population growth from 1986 to 2016 has been estimated at 0.54 percent per annum to a 2016 population of 42,171.

TABLE 6.1
CARLETON-VICTORIA REGION ZONE POPULATION PROJECTIONS

Waste Generation Zones #	Description		Actual 1971	1976	1981	1986	Projected 1992	1996	2001	2006	2011	2016
1	Denmark	P	1,730	1,754	1,753	1,800	1,816	1,832	1,853	1,874	1,895	1,916
2	Grand Falls	P (1)	1,002	911	861	866	866	866	866	866	866	866
	Andover	P	927	1,011	1,035	1,123	1,189	1,238	1,299	1,361	1,422	1,483
	Aroostook	V	550	464	403	403	403	403	403	403	403	403
	Sub-total		2,479	2,386	2,299	2,392	2,459	2,507	2,569	2,630	2,691	2,752
3	Plaster Rock	V	1,308	1,345	1,199	1,232	1,232	1,232	1,232	1,232	1,232	1,232
4	Lorne	P	685	714	711	728	728	728	728	741	744	754
	Gordon	P	1,894	1,919	1,833	1,952	1,952	1,952	1,952	1,952	1,957	1,966
	Sub-total		2,579	2,633	2,544	2,680	2,680	2,680	2,680	2,693	2,700	2,719
5	Perth	P	1,206	1,222	1,267	1,361	1,402	1,443	1,494	1,545	1,596	1,647
	Tobique 20	R	434	492	446	542	554	576	604	631	659	687
	Sub-total		1,640	1,714	1,713	1,903	1,955	2,018	2,097	2,176	2,255	2,334
6	Perth-Andover	V	2,049	1,973	1,872	1,889	1,889	1,889	1,889	1,889	1,889	1,889
7	Kent	P	2,597	2,361	2,364	2,448	2,448	2,448	2,448	2,448	2,448	2,448
	Aberdeen	P	1,354	1,268	1,247	1,192	1,192	1,192	1,192	1,192	1,192	1,192
	Bath	V	920	882	794	738	738	738	738	738	738	738
	Bristol	V	771	860	824	770	770	770	770	770	770	770
	Sub-total		5,642	5,371	5,229	5,148	5,148	5,148	5,148	5,148	5,148	5,148
8	Florenceville	V	753	768	709	725	725	725	725	725	725	725
9	Wicklow	P	1,632	1,648	1,759	1,806	1,882	1,933	1,996	2,059	2,123	2,186
	Wilmot	P	1,242	1,163	1,184	1,210	1,210	1,210	1,210	1,210	1,210	1,210
	Simonds	P	489	566	533	589	616	638	664	691	718	745
	Centreville	V	566	606	577	543	547	539	529	519	509	499
	Sub-total		3,929	3,983	4,053	4,148	4,255	4,319	4,399	4,480	4,560	4,640
10	Brighton	P	1,469	1,541	1,662	1,825	1,945	2,040	2,159	2,278	2,397	2,516
	Peel	P	1,214	1,142	1,174	1,252	1,252	1,252	1,261	1,276	1,290	1,305
	Sub-total		2,683	2,683	2,836	3,077	3,197	3,292	3,421	3,554	3,688	3,821
11	Hartland	T	1,006	971	843	917	917	917	917	917	917	917
12	Wakefield	P	2,022	2,195	2,363	2,506	2,709	2,839	3,001	3,163	3,325	3,487
13	Woodstock	T (2)	5,164	5,187	4,924	4,824	4,824	4,824	4,824	4,824	4,824	4,824
14	Woodstock	P (2)	1,089	1,240	1,287	1,530	1,656	1,766	1,903	2,040	2,177	2,314
	Richmond	P	983	952	1,118	1,181	1,264	1,325	1,401	1,477	1,553	1,629
	Woodstock	R	161	150	169	142	142	142	142	142	142	142
	Sub-total		2,233	2,342	2,574	2,853	3,062	3,233	3,446	3,659	3,872	4,085
15	Northampton	P	996	1,061	1,128	1,231	1,312	1,374	1,451	1,529	1,606	1,683
	Total		**36,213**	**36,366**	**36,039**	**37,325**	**38,180**	**38,830**	**39,652**	**40,491**	**41,325**	**42,171**

6.2 Industrial and Other Economic Growth

As part of the interviews with municipal officials and the regional development commissions of Carleton and Grand Falls Regions, each were asked whether or not they foresaw any particular upcoming developments which would be expected to alter growth patterns of the Carleton - Victoria Region. All speculated that the Region has experienced in the past a relatively slow but stable economic growth, which should continue into the future.

Agriculture and the agri-food industry have been the mainstay of the Carleton County economy. Even during the present recession, these industries have in general retained financial stability. The predominant potato farming sector of the agriculture industry in Carleton County has been less vulnerable than the grain and livestock sectors to international protectionism and depressed markets. This has been due to the strong support and success of the local agri-food processing industry and established table and seed potato markets. It is felt that this stability will carry on into the future.

The forestry industry is prominent throughout the eastern parts of the Region, back of the Saint John River Valley. Most of the forestry manufacturing industry in the Region is lumber sawmills, pulpwood and wood chips are transported out of the Region for processing. While the lumber industry has been down from the current recession, the outlook appears good. The housing construction industry has been forecast to recover this year, and the recent U.S. tariffs imposed on Canadian lumber exports were exempted from Atlantic Region exports to the U.S.A.

Overall substantial economic growth or radical change in the industrial composition of the Region is not expected in the near future. Municipal and regional development officials felt that the basic economic structure of the Region will most likely remain more or less as it is at present, with modest growth at best. Long term economic and industrial conditions are all but impossible to predict. Therefore, to the extent that industrial production growth and associated ICI waste generation levels are correlated to population growth, it is expected that ICI wastes will increase proportional to residential wastes in the future.

6.3 Future Solid Waste Quantities

Forecasting solid waste quantities is performed to ensure that the Phase II evaluation of regional waste management alternatives preliminary design concepts are not underestimated, such that they would not accommodate the future needs of the Region. The forecast of the Carleton-Victoria Region solid wastes includes all residential and ICI waste volumes which are presently disposed of at the local dumps or recycled. Other wastes retained on-site or reused by ICI firms are not included in the forecast.

Table 6.2 summarizes the predicted future residential and ICI waste quantities generated throughout the Carleton - Victoria Region from the present year 1992 to 2016. It is projected that total waste generated in the Region will exceed 36 thousand tonnes by year 2016. This forecast has been projected from present waste generation levels at growth rates synonymous with the population forecasts per zone provided in Table 6.1. This innately assumes that waste generated in the Carleton - Victoria Region will continue at present per capita levels into the future.

It is both possible and preferable that per capita waste generation levels may not remain constant in the future and instead be reduced. This possibility is contingent upon the ability of the industrial and commercial and residential communities to reduce packaging and reuse materials presently entering the waste stream. This would reduce the total requirement for disposal capacity in the Region. Similarly, any future growth in recycling, composting or other waste diversion activities of both residential and ICI waste materials will also reduce waste from the need for disposal.

TABLE 6.2
CARLETON-VICTORIA REGION
PROJECTED RESIDENTIAL AND ICI SOLID WASTE VOLUMES

ZONE	YEAR					
	1992	1996	2001	2006	2011	2016
1-Denmark	610	615	622	629	636	643
2-Grand Falls	829	845	866	886	907	927
3-Plaster Rock (V)	423	423	423	423	423	423
4-Lorne/Gordon	900	900	900	904	907	913
5-Perth	657	678	704	731	757	784
6-Perth-Andover (V)	648	648	648	648	648	648
7-Kent/Aberdeen	1,740	1,740	1,740	1,740	1,740	1,740
8-Florenceville (V)	249	249	249	249	249	249
9-Wicklow/Wilmot	1,433	1,454	1,481	1,508	1,535	1,562
10-Peel/Brighton	1,074	1,106	1,149	1,193	1,238	1,283
11-Hartland (T)	315	315	315	315	315	315
12-Wakefield	910	953	1,008	1,062	1,116	1,171
13-Woodstock (T)	1,655	1,655	1,655	1,655	1,655	1,655
14-Woodstock/Richmond	1,028	1,085	1,157	1,229	1,300	1,372
15-Northampton	441	461	487	513	539	565
TOTAL RESIDENTIAL	**12,909**	**13,127**	**13,403**	**13,685**	**13,965**	**14,249**
TOTAL ICI	**20,066**	**20,405**	**20,834**	**21,272**	**21,707**	**22,149**
GRAND TOTAL	**32,975**	**33,532**	**34,237**	**34,957**	**35,672**	**36,397**

APPENDIX A

LIST OF SOURCE MATERIAL

List of Source Material

1. Phase I: A Waste Audit, Madawaska-Victoria Solid Waste Management Provisional Committee, 1991.

2. Westmorland/Albert Region Waste Audit, Westmorland/Albert Solid Waste Management Committee, 1989.

3. Audit/Acadian Peninsula, Comité de Gestion de Déchets Solides de la Péninsule Acadienne, 1989.

4. Waste Audit Report, Kings County Region Solid Waste Management Provisional Committee, 1989.

5. Waste Audit Report, Committes for Solid Waste Management - Kent, 1989.

6. Waste Audit, Restigouche Region Solid Waste Provisional Committee, 1989.

7. Phase I Waste Audit, Northumberland Region Solid Waste Provisional Committee, 1990.

8. Phase I - Waste Audit, Fundy Solid Waste Action Team, 1990.

9. Phase I: Waste Audit, Charlotte Region Solid Waste Provisional Committee, 1991.

10. Solid Waste Management Alternatives for Saint John and Kings County, N.B. Municipal Affairs and Environment, 1988.

11. Census Division and Subdivisions - 1971, 1976, 1981, 1986, Statistics Canada.

12. New Brunswick Recycling Study, Fiander-Good Associates Ltd., 1991.

13. Transfer Station Manual, Alberta Environment, 1982.

14. Solid Wastes: Engineering Principles and Management Issues, G. Tchobanoglous, 1977.

15. The Fredericton Recycling Experience, N.B. Department of the Environment, 1990.

16. City of Guelph - Full Scale 'Wet/Dry' Processing Facilities - Preliminary Engineering, R. Cave and Associates Ltd., 1990.

17. Municipal Refuse Statistics for Canadian Communities Over 100,000, Bird & Hale Ltd., 1979.

18. Characterization of Municipal Solid Waste in the United States, 1960 to 2000, Franklin Associates Ltd., 1988.

19. Annual Report of Municipal Statistics - 1990, N.B. Department of Municipal Affairs, 1991.

20. New Brunswick Directory of Products and Manufacturers, 1990, N.B. Department of Commerce and Technology, 1990.

21. Industrial, Commercial and Service Directory, Grand Falls Region Development Commission Inc., 1990.

22. Directory of Manufacturers Retail and Service Industries, Carleton Regional Development Commission Inc., 1991.

23. Education Statistical Information, 1990-1991, N.B. Department of Education, 1991.

24. Timber Utilization Survey for the Year 1989, N.B. Department of Natural Resources and Energy, 1990.

25. 1986 Census of Agriculture, Sub-Provincial Data, Statistics Canada.

26. Economic Availability of Wood Residue in New Brunswick, ADI Limited, 1987.

27. A Guide for Chemical Management at Wood Protection Facilities in Atlantic Canada, Owen Washburn Associates Ltd., 1991.

APPENDIX 'B'

Municipalities Survey Questionnaire
LSD Survey Questionnaire
Waste Collectors Survey Questionnaire
Recyclers Survey Questionnaire
Disposal Site Authorities Survey Questionnaire
ICI Survey Questionnaire

SURVEY QUESTIONNAIRE - MUNICIPALITIES

Municipality: _____

Contact: _____

Title: _____

Telephone: _____

Date: _____

Fiander-Good Associates Ltd., a private Fredericton based consulting firm has been contracted by the Valley Solid Waste Committee to conduct a solid waste audit of the Carleton/Victoria Solid Waste Management Region. The purpose of the audit is to identify the types and quantities of Waste being generated in the region and to gain an understanding of how these wastes are being collected and disposed of.

1. What is the current population of your municipality? _____

2. What are the current number of households in your municipality? _____

3. Do you anticipate a major increase in population in your municipality over the next 5 years? Explain. _____

_____

4. Do you anticipate any major commercial or industrial developments in your municipality in the next 5 years? Explain.

_____

_____

5. a). What disposal site is used by your municipality?

Name of site: _____

b). Who is the designated authority for the operation of the disposal site used by your municipality?

_____

6. How much and what type of wastes are generated by your municipal services? (ie. administrative offices, works, fire & police, etc.)

_____

_____

_____

_____

7. What is the total annual budget for the municipality's share of disposal site operation and maintenance costs?

Cost: $_____ per _____

These costs include: _____

_____

8. If this municipality is the designated authority for the operation of the disposal site are there any other municipalities, communities or other outside users sharing the cost of disposal site operation and maintenance? Please provide details:

_____

_____

_____

9. How is your municipality's residential waste collected?

a) If the municipality contracts waste collection services obtain contractor name(s) and telephone numbers and cost of service:

Contactor name: _____

Telephone Number: _____

Cost of service: $_____ per _____ Is there an annual contract? _____

Contactor name: _____

Telephone number: _____

cost of service: $_____ per _____ Is there an annual contract? _____

Is there a householder contribution to the cost of service? Explain: _____

_____

b) If residents employ the services of private contractors obtain names and telephone numbers of private contactors:

Contactor name: _____

Telephone number: _____

Contactor name: _____

Telephone number: _____

Contactor name: _____

Telephone number: _____

10. How are industrial, commercial, institutional (ICI) wastes collected in your municipality? By Whom? (insert above)

_____

_____

11. Does your municipality have any provision for collection and disposal of special ICI wastes? Please provide details.

_____

_____

a) If not, how are ICI wastes collected and disposed of in your municipality? _____

_____

_____

12. Does your municipality have any provision for collection and disposal of special residential wastes? ie. white goods, household hazardous wastes, etc.? Please provide details.

_____

_____

If not, how are residential special wastes collected and disposed of in your municipality? _____

_____

_____

13. Are there any recycling operations in your municipality? Who? Residential? or ICI? _____

_____

_____

14. Other issues: _____

_____

_____

SURVEY QUESTIONNAIRE - LSD'S

LSD: _____

Contact: _____

Title: _____

Telephone: _____

Date: _____

Fiander-Good Associates Ltd., a private Fredericton based consulting firm has been contracted by the Valley Solid Waste Committee to conduct a solid waste audit of the Carleton/Victoria Solid Waste Management Region. The purpose of the audit is to identify the types and quantities of Waste being generated in the region and to gain an understanding of how these wastes are being collected and disposed of.

1. What is the current population of your LSD? _____

2. What are the current number of households in your LSD? _____

3. Do you anticipate a major increase in population in your LSD over the next 5 years? Explain. _____

_____

4. Do you anticipate any major commercial or industrial developments in your LSD in the next 5 years? Explain.

_____

_____

5. a). What disposal site is used by your LSD?

Name of site: _____

b). Is DOT the designated authority for the operation of the disposal site used by your municipality?

_____

6. Is your LSD's residential waste collected or resident self-delivery? _____

7. If residents employ the services of private contractors obtain names and telephone numbers of private contactors:

Contactor name: _____

Telephone number: _____

Contactor name: _____

Telephone number: _____

Contactor name: _____

Telephone number: _____

8. How are industrial, commercial, institutional (ICI) wastes collected in your LSD? By Whom? (insert above)

_____

_____

9. Other issues: _____

_____

_____

SURVEY QUESTIONNAIRE - RECYCLERS

Recycler: _____

Contact: _____

Title: _____

Telephone: _____

Address: _____

_____ **postal code:** _____

Date: _____

1. How long have you been in business? _____
2. How many people do you employ? _____
3. How many households do you serve? _____
4. (a) What kind of collection vehicle do you use? _____

   (b) How many vehicles do you use? _____

   (c) How many people are required per vehicle to operate and collect materials? _____

   (d) How frequent is your collection service? _____
5. What kind of storage/processing facilities does your operation employ?

   _____
6. Is there any seasonality associated with your operation? Please explain. _____
7. Do you have plans to expand your operation? Please explain: _____

   _____
8. (a) What diversion rate does your recycling system achieve?

   _____

   (b) What is your community's recycling participation rate? _____
9. (a) What materials do you collect and who are the primary generators?

   _____

   _____

(b) Can you approximate the volume and weight of materials you collect each month.

Material:	Generator(s)	Tonnes/Month
Old corrugated cardboard		
CPO (computer paper)		
Other office fine paper		
Newspaper		
Clear glass		
Coloured glass		
Plastic grocery bags		
Rigid plastics (Pet bottles, high density polyethylene bottles)		
Aluminum cans		
Scrap metals		

10. (a) What are the current markets for these materials?

(b) What are the market prices you receive for these materials?

Material:	Market:	Price/T;(or unit)
Old corrugated cardboard		
CPO (computer paper)		
Other office fine paper		
Newspaper		
Clear glass		
Coloured glass		
Plastic grocery bags		
Rigid plastics (PET bottles, high density polyethylene bottles)		
Aluminum cans		
Scrap metals		

(c) How stable are the markets for the goods mentioned above?

_____

(d) What projections would you have for future markets of the above materials?

_____

_____

(e) How stable are these prices? What has been your experience in the past with regard to prices for recycled goods?

_____

_____

_____

(f) What projections would you with regard to future prices for recycled materials?

_____

_____

(g) Do these prices include transportation? _____ How do you transport your materials to market, and how often do you send out shipments?

_____

_____

(h) Have these prices changed substantially over the past year? If so how? _____

_____

_____

SURVEY QUESTIONNAIRE - WASTE COLLECTORS

Waste Collector: _____

Telephone: _____

Address: _____

_____ **postal code:** _____

Date: _____

Hello, my name is _____ of Fiander-Good Associates Ltd, a private Fredericton-based consulting firm. We have been contracted by the Valley Region Solid Waste Committee to conduct a solid waste audit of the Carleton/Victoria Region. The purpose of the audit is to identify the types and quantities of Waste being generated in the region and to gain an understanding of how these wastes are being collected and disposed.

1. What municipalities, communities or rural areas do you serve? _____

_____

2. Do you have a residential route? _____ if yes:

a) How many households are on your residential route? _____

b) How often do you collect at these households? _____

c) How many trips to the disposal site does your residential route require? _____

d) Is your vehicle usually filled to capacity with each trip to the disposal site? _____

e) Have you noticed any changes in the types/volumes of materials you have collected within the last 5-10 years? Please explain: _____

_____

_____

f) What do you charge for your residential pick-up service? _____

g) How has this rate changed over the last 3 years? _____

h) How is the waste set at roadside?

Garbage bags _____ Plastic/steel garbage cans _____ cardboard boxes _____

3. Do you have a commercial route? _____ if yes:

a) How many customers do you serve? _____

b) What kinds of materials do you collect? _____

c) Have you noticed any changes in the types/volumes of materials you have collected within the last 5-10 years? Please explain: _____

_____

d) How often do you collect from these customers? _____

e) How many trips to the disposal site does your commercial route require? _____

f) Is your vehicle usually filled to capacity with each trip to the disposal site? _____

g) What do you charge per for commercial pick-up? _____

h) Has this rate remained stable or increased within the last 5 years? _____

i) What types of waste containers do the commercial set out for pick up? _____

_____

4. What disposal facility(ies) do you use? _____

5. Have you ever experienced problems with this facility(ies)? Please explain: _____

_____

6. (a) How many people are employed by your operation?

_____ just self

Others, please specify: _____

(b) How long have you been in operation? _____

7. What type of vehicle(s) do you use? Year _____

Compactor truck _____ estimated volume capacity _____

1 ton truck _____ estimated volume capacity _____

1/2 ton truck _____ estimated volume capacity _____

Overhead Dumpster _____ estimated volume capacity _____

Other - please specify _____ estimated volume capacity _____

8. How do you deal with high volumes of wastes? ie do you use additional trucks, employ extra help or work overtime? _____

a) Is there a seasonal variation in goods collected? _____

_____

b) Does this create a problem? _____

_____

_____

9. Can your services be expanded? (additional pick-up points or frequency)? _____

_____

10. What plans do you have to change the scope or nature of your business in the foreseeable future? _____

_____

11. Are you involved in recycling? _____ if yes:

a) What type of materials do you collect? _____

b) From where do you collect these materials? _____

c) Where do you take them? _____

d) What prices do you receive for them? _____

e) Details/comments: _____

_____

_____

12. Do you have any comments or concerns you would like us to record? _____

_____

_____

_____

SURVEY QUESTIONNAIRE - DISPOSAL SITE AUTHORITIES

Disposal site: _____

Designated Authority: _____

Contact: _____

Title: _____

Telephone: _____

Date: _____

1. What is the method of disposal used at this site?

   Trench _____ Area fill _____ Other _____

2. What is the total land area for the site? _____

3. What is the total excavated area of the landfill? _____

4. What percentage of the landfill is already filled to capacity? _____

5. What is the life expectancy of the site under present conditions? _____

6. What municipalities and/or communities are served by the site?

   _____

   _____

7. If possible please provide the total population and/or number of households served by the site.

   Population: _____ Number of households: _____

8. (a) What is the total volume or tonnage of waste handled at the site per week or per year?

   _____

   (b) If commercial/industrial wastes are accepted at the site, what types of wastes do these include?

   _____

   _____

9. (a) What are the hours of operation of the site?

   _____

   (b) Is the site staffed? _____

   If yes, for how many months during the year? Specify: _____

   _____

10. (a) What is the method and frequency of applying cover material at the site?

_____

_____

(b) Total overall annual operation and maintenance costs for site: _____

11. (a) Is there any waste separation at the site? _____

If yes, which method is used? _____

(b) Is there any recycling at the site? _____

If yes, explain: who is recycling and what is being done with the recycled material? _____

_____

12. (a) Is there fencing at the site? partial _____ complete _____

(b) Is there a main security gate at the site? _____

(c) Are there signs marking the location of the site? _____

(d) Is burning permitted at the site? _____

If not, does it happen anyway? _____

(e) How are rodents and other pests controlled at the site? _____

_____

13. Please provide details of any operational or maintenance problems experienced with the site?

_____

_____

14. Are you aware of any public concerns about the site? _____

If yes, please explain: _____

_____

_____

WASTE DISPOSAL SITE CHARACTERISTICS

1. Site of name & hours of supervised operation (Mon-Sun; 8am-5pm).
2. Staffing of site (or none).
3. Operating authority (NB DOT, municipality, private, other).
4. Certified by NB DOE?
5. Area served & approximate number of users.
6. Known major generators of waste disposed at site.
7. Origin of waste (% domestic, institution, small business, other IC).
8. Annual cost of site operations.
9. Age of site.
10. Condition of on-site and access roads.
11. Number of locked access gates and extent of fencing.
12. Method of disposal (trench, area fill, other).
13. Burning of refuse done on-site?
14. Method and frequency of covering.
15. Frequency and type of waste separation (metals, wrecked cars & large appliances, brush, combustibles).
16. Nearest occupied dwelling/house (prevailing wind direction).
17. Presence of nearby surface groundwater sources (stream, swamp)
18. Controls over types of garbage dumped (i.e. no animal carcasses, toxic material, petroleum byproducts).
19. Poisoning undertaken to control rodents (signs posted)?
    Any problems encountered?
20. Collection and monitoring of leachate.
21. Total area (ha/acres/m2).
22. Percent of area already filled.
23. Percent of area still available.

CARLETON/VICTORIA REGION WASTE AUDIT

INDUSTRIAL/COMMERCIAL/INSTITUTIONAL WASTE GENERATORS

Establishment: _____

Contact(s): _____

Title: _____

Telephone: _____

Hello, my name is _____ of Fiander-Good Associates, a private Fredericton-based consulting firm. We have been contracted by the Valley Region Solid Waste Committee to conduct a solid waste audit of the Carleton/Victoria Region. The purpose of the audit is to identify the types and quantities of Waste being generated in the region and to gain an understanding of how these wastes are being collected and disposed. A covering letter was sent to your firm explaining the general content and purpose of the information required for the audit. Confidentiality of information will be protected by reporting industry aggregated figures only.

1. (a) How much waste does your firm produce in total? (ie. in tonnes, truckloads, containers, bags, etc.)

_____

(b) If a truck or container has been specified, what is its capacity? (ie. cubic yards, cubic metres)

_____

(c) How is your waste disposed?

(d) On Site? _____

(e) Name of collector if applicable: _____

(f) Disposal site use: _____

(g) Containment & Collection/transportation method (+ Frequency): _____

_____

_____

(h) Cost of waste collection and disposal (indicate time and approximate wages if no specific budget item is identified):

_____

_____

(i) What is the Peak Waste Generation Period?

_____

2. (a) What general types of waste does your firm generate? and in what approximate proportions (in percentage) of the total?

(1) paper wastes _____%

(2) plastic wastes _____%

(3) Metals _____%

(4) organic wastes (ie. food scraps, etc.) _____%

(5) glass _____%

(6) wood wastes _____%

(7) other special wastes _____%

(b) Of these wastes generated by your firm what are the approximate percentages composition of each type of waste?

1). paper Amount: _____

- Old Corrugated Cardboard ( )
- boxboard Cereal-box grade cardboard (etc.) ( )
- white paper ( ) computer print-out ( ) coloured paper ( )
- newspaper ( )

2). plastic Amount: _____

- PET pop bottles ( )
- plastic film bags ( )
- rigid plastic containers ( )
- plastic packaging ( )
- other, specify ( ) _____

3). metal Amount: _____

- cans: aluminum cans ( ) steel/tin cans ( )
- other aluminum ( )
- other steel - scrap ( ), specify what type
- copper ( )
- tin ( )
- brass ( )

4). compostible organic/putrescible Amount: _____

- food waste ( ) (ie. cafeteria/restaurant)
- potato waste ( )
- grass cuttings ( )
- other, specify ( ) _____

5). glass Amount: _____

- bottles: clear ( ) or color mixed ( )
- windows ( )

6). wood Amount: _____

- scrap lumber ( )
- wood chips ( )
- yard trimmings ( )
- other, specify ( ) _____

7). other special waste Amount: _____

- radio-active waste ( )
- gyproc, asphalt & misc. bldg. materials ( )
- solvents & containers ( )
- paint & containers ( )
- batteries ( )
- tires ( )
- used motor oil ( )
- cooking grease ( )
- cloth ( )
- other ,specify ( ) _____

3. (a) Does your firm recycle any wastes? _____

(b) Do you do any on-site processing of the waste? (to reduce volume, or alter its physical form)

- cardboard bailing
- incinerating
- compaction
- shredding
- composting

(c) If externally recycled, how are they handled? by whom? to what market? and at what price? _____

_____

_____

_____

(d) What volume(s) of waste items are recycled? _____

_____

_____

4. Do you have any comments, questions, or concerns you would like us to record?

_____

_____

_____

_____

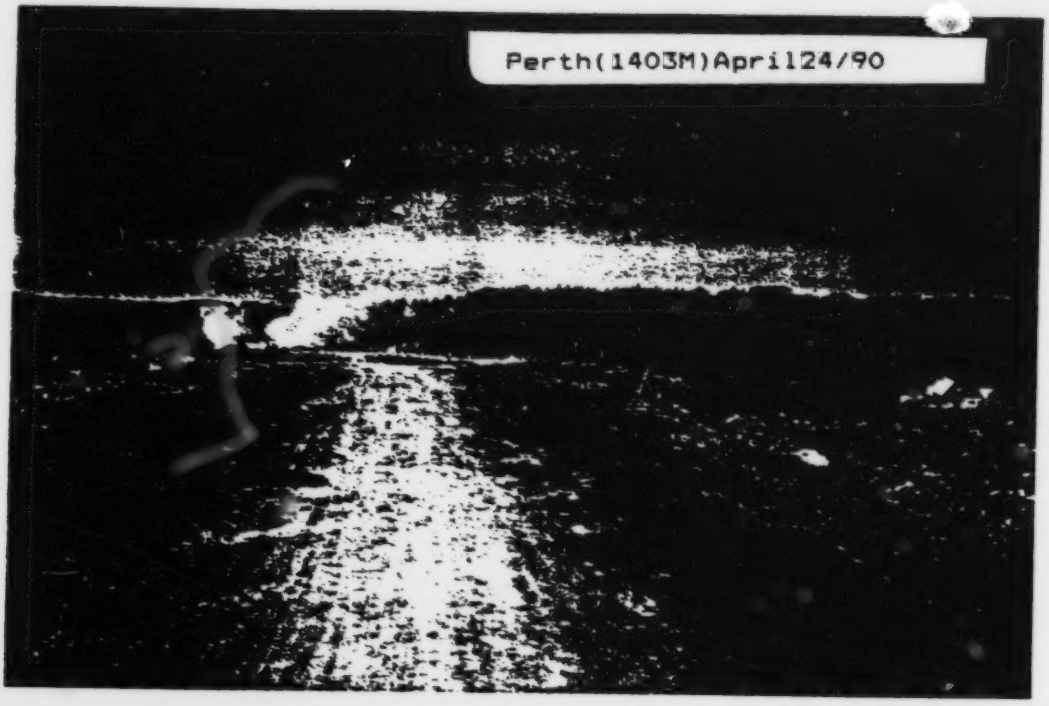
_____

_____

APPENDIX 'C'

Carleton - Victoria Region Dump Sites

Hartland/1301P/July 11/91

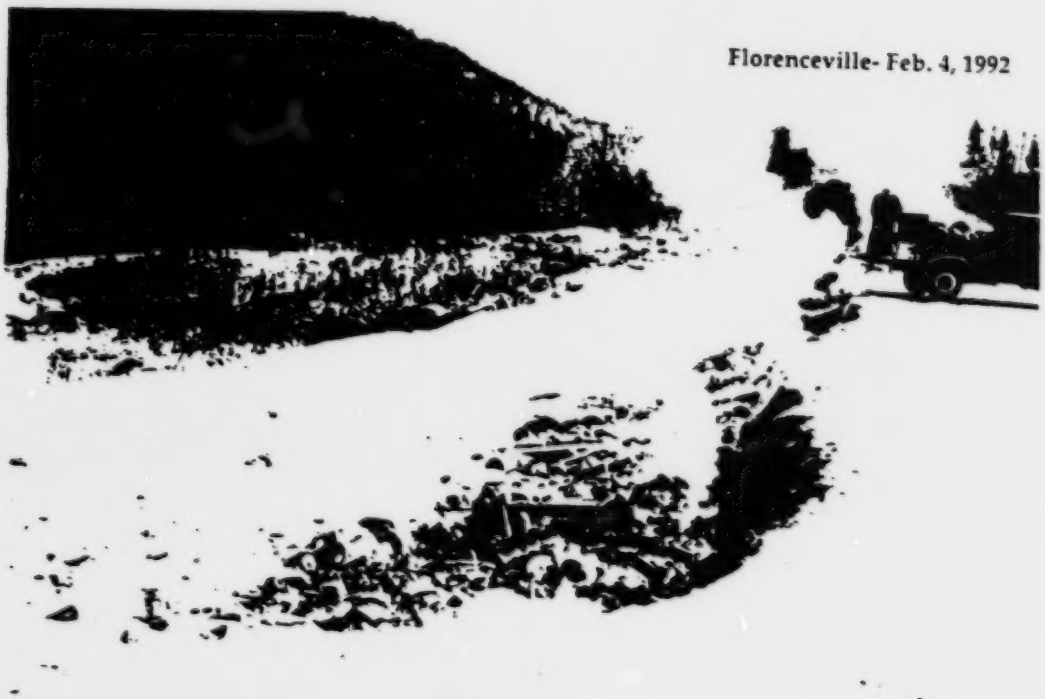


Perth- Feb. 13, 1992

Bristol- Feb. 12, 1992

Bristol - 1305M - Aug. 28/89

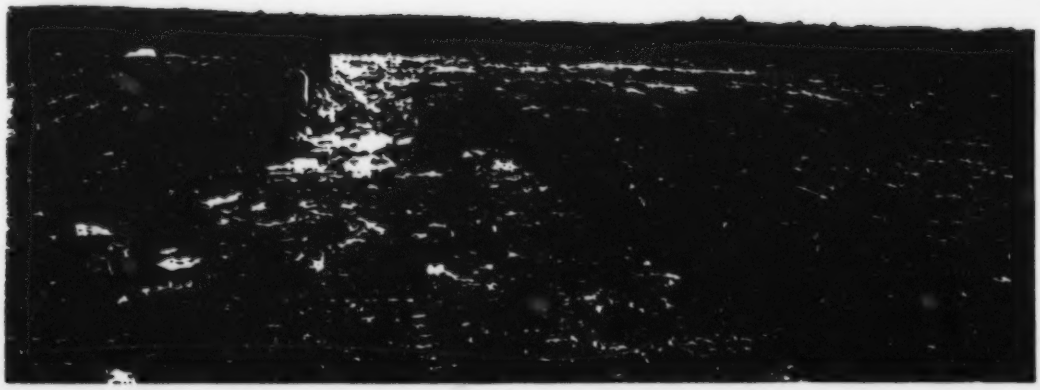
Woodstock 1992 June 1/83



Florenceville- Feb. 4, 1992

Woodstock- Jan 28, 1992

Woodstock - 1302M - Aug. 28/89



Centreville 1306M Oct. 8, 1987

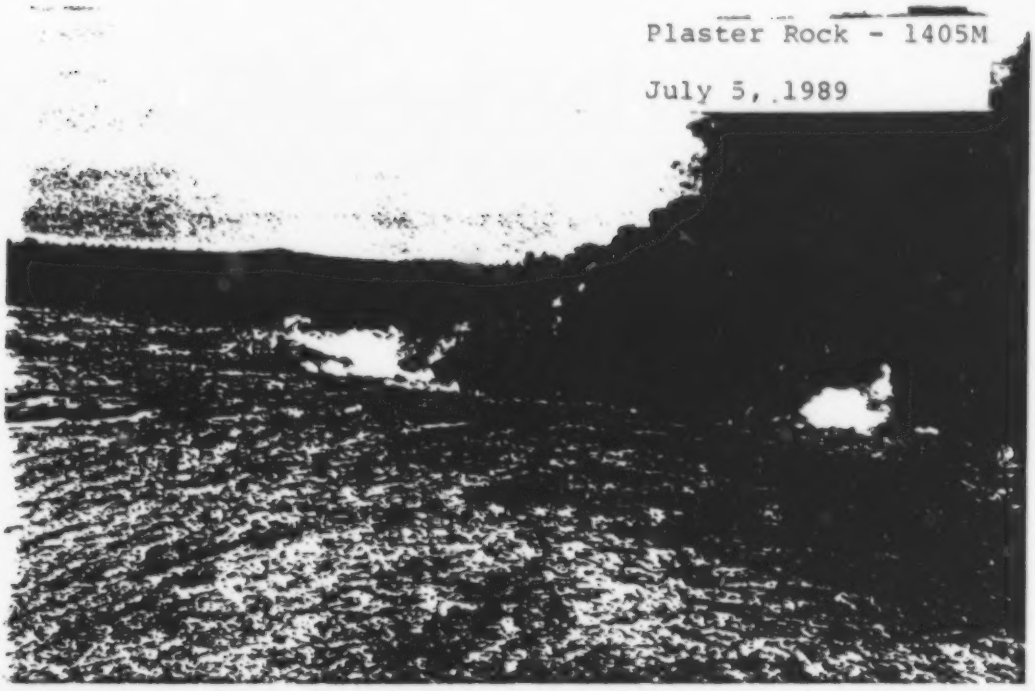
Centreville- Feb. 4, 1992

Bath - 1304M - Aug. 28/89

Bath- Feb 5, 1992

Plaster Rock - 1405M

July 5, 1989



Plaster Rock- Feb. 6, 1992

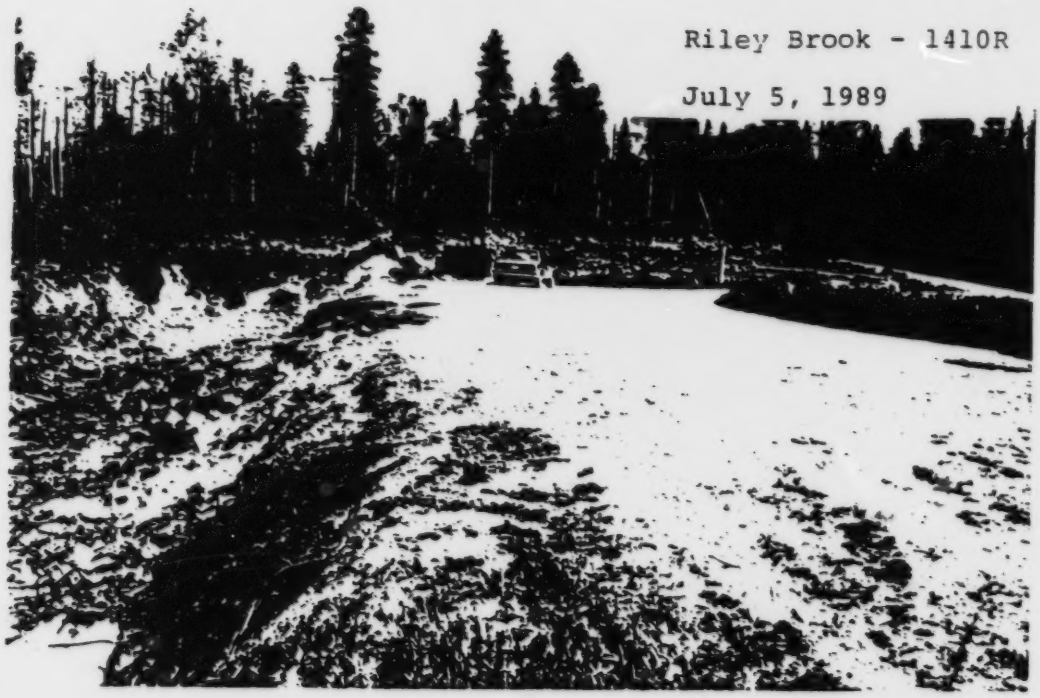
(34) #1315 - Glassville - August 27, 1986

Glassville- Feb 7, 1992

Coldstream - 1317R

June 22, 1989

Waterville 1310R May 13, 1987



Riley Brook - 1410R

July 5, 1989

(45) =1408 - Arthurette - August 27, 1986

Four Falls- Feb. 13, 1992

APPENDIX 'D'

Recycling Facilities at Woodstock